the OIL AND GAS JOURNAL

WARREN Marketing

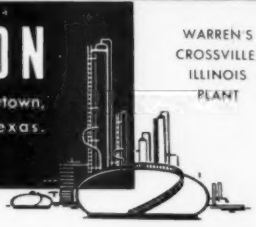
WARREN'S MARKETING RECORD
1948
1922
From 4,900,000 gallons of Natural Gasoline in 1922, to approximately 2,000,000,000 gallons of Natural Gasoline and Liquefied Petroleum Gas in 1948.

WARREN PETROLEUM CORPORATION

Producers, Manufacturers, Exporters and Marketers

Export Terminals: Corpus Christi, Port Arthur, Baytown, Texas City, and Norsworthy, Houston, Texas.

TULSA 2, OKLAHOMA CABLE ADDRESSES: Stavolene, Warren



Crude Oil, Natural Gasoline and Liquefied Petroleum Products

PRICE 50 CENTS

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AUGUST 4, 1949

HORTONSPHERES...

Hortonspheres are the most modern answer to the problem of storing volatile hydrocarbons under pressure. Their spherical shape, their wide range of design pressures (30 to 150 lbs. per sq. in.) and their efficient use of materials, all combine to form a positive, economical means of storing liquids or gases requiring relatively high pressures.

Hortonspheres are recommended for storing the more volatile grades of natural gasolines, butanes, butane-propane mixtures, and volatile refinery stocks. Standard designs include units up to 65 ft. in diameter for gases, or 25,000-bbl. capacity for liquids.

Our Bulletin F contains information on how to compute required storage pressures for Hortonspheres used to store volatile products. Write our nearest office for your copy.

Illustrated here are four Hortonspheres, each of 7,500-bbl. capacity, installed at a large eastern refinery. The two end spheres are designed to withstand 75 lbs. per sq. in. pressure, while the two spheres in the center operate at a pressure of 85 lbs. per sq. in.

CHICAGO BRIDGE & IRON COMPANY

ATLANTA • BIRMINGHAM • BOSTON • CHICAGO • CLEVELAND • DETROIT • HOUSTON
LOS ANGELES • NEW YORK • PHILADELPHIA • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TULSA

L7 A Husky Steel

for Low-Temperature Bolting

When refinery engineers encounter bolting conditions with temperatures as low as −150 F, they can count on Bethlehem fastenings made from Bolting Grade L7. For at this low temperature, L7 offers minimum impact strength of 15 ft-lbs. It's a husky through and through—a heat-treated alloy steel which has been specially developed for the manufacture of studs and bolts for service at sub-zero temperatures. It conforms to ASTM Specification A320—48T, and fulfills the following chemical and tensile requirements:

L7—CHEMICAL REQUIREMENTS

	RANGE	Check Variation Over or Under *
Carbon, pct	0.38 to 0.45	0.02
Manganese, pct	0.75 to 1.00	0.04
Phosphorus, pct	0.040	0.005 over
Sulphur, pct	0.040	0.005 over
Silicon, pct	0.20 to 0.35	0.02
Chromium, pct	0.80 to 1.10	0.05
Molybdenum, pct	0.15 to 0.25	0.02

**Unless otherwise specified, separate determinations may vary from the specified ranges, except that elements in any heat must not vary both above and below the specified range.*

L7—TENSILE REQUIREMENTS

Diam, In.	Tensile Strength min psi	Yield Point min psi	Elongation in 2 in. min pct	Reduction of area min pct
2½ and under	125,000	105,000	16	50
Over 2½ to 4 incl.	105,000	80,000	20	50

Grade L7 fastenings can be obtained in short order, because the steel from which they are made is a stock item with Bethlehem. They are recommended for use with the Bethlehem Grade 4 carbon-molybdenum nut, also carried in stock. Bethlehem also produces a wide range of steels for use in high-temperature bolting.

Along with its fully-equipped fastenings plant at Lebanon, Pa., Bethlehem has an engineering staff which is available to work with you in solving virtually any low-temperature or high-temperature fastenings problem that comes along. So put your fastenings needs up to us . . . today, tomorrow, any time.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Bethlehem supplies every type of Fastening

3 REASONS WHY CHAPMAN STEEL VALVES are your best buy

1. The high-precision ratings of custom-made valves—at production line prices.
2. Made from quality-controlled steels developed and produced in Chapman's own foundries under strictest metallurgical control.
3. Designed to meet A.S.A. and A.P.I. Standards in all pressure and temperature ranges.

Whenever you need Steel Valves—gate, globe, angle, or check—come to Chapman first. Backed by years of research, development and performance, Chapman Steel Valves are your guarantee of better . . . longer service.

The Chapman Valve Mfg. Co., Indian Orchard, Massachusetts

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Endless grommet V belts end most cord failures

B. F. Goodrich grommet V belts cut costs 20 to 50%

THAT large loop of cord is a grommet, made by winding heavy cord on itself to form an endless loop. It is one of the twin grommets that make up the cord section of a B. F. Goodrich grommet V belt. The small loop, with the two ends showing, is one of the cords that make up the cord section of an ordinary V belt. Most of the failures in ordinary V belts occur in the region where cord ends overlap. Because the cord in a grommet V belt is in effect endless, such failures are eliminated.

Longer life—Elimination of overlapping cord ends, helps grommet V belts last 20 to 50% longer than ordinary V belts. *Concentrated* cord strength is another reason—all the cord in a B. F. Goodrich grommet V belt is in the twin grommets, each of which is placed close to a driving face of the pulley. This insures maximum power delivery, even load distribution, full use of all cord strength.

Better grip—Because a grommet V belt has no stiff, inflexible overlap section, every part of the belt is equally flexible, gives uniform grip, reduces slip. Size for size, grommet V belts give you ⅓ more gripping power, pull heavier loads, with a higher safety factor. Less heat is generated, cord and adhesion failures are reduced.

No other V belt is a grommet V belt! Twin grommet construction is an exclusive B. F. Goodrich feature—no other V belt has it. Grommet construction is protected by U. S. Patent No. 2,233,294. (Now available in D and E sizes only.) To make sure you get genuine grommet V belts, see your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

We make it easy for you to use

J&L STEEL *Shot Hole Casing*

15,000# average joint pull-out strength of J & L Shot Hole casing gave 100% casing recovery from this hole despite flared end.

★ *Greater Recovery -reduced costs on seismograph work*

★ *Readily Available -stocks on hand at convenient locations*

The average joint pull-out strength of J&L Shot Hole Casing is 15,000 lbs. This means greater recovery—repeat use and lower costs. Also, the Integral Joint with its square, rolled threads eliminates independent couplings. Available in convenient lengths, 16 gauge, 3" or 4" OD.

Whenever you need shot hole casing, you get all these advantages plus prompt delivery by calling your nearest Jones & Laughlin Supply store. If that store does not stock casing, the manager will wire or phone the nearest stocking point for casing to be delivered when and where you want it. This service means no crews waiting, schedules completed on time—so use it for your next casing requirements.

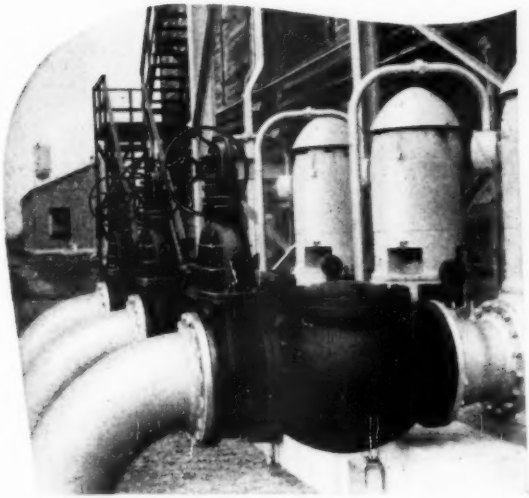
JONES & LAUGHLIN SUPPLY COMPANY

Subsidiary of
Jones & Laughlin Steel Corporation

Tulsa, Oklahoma

For widest choice in piping ...see the complete CRANE line

ONE SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



And see for yourself how Crane helps you simplify every piping procedure. From original plan to final erection and maintenance of any piping job, one order to this **Single Source of Supply** brings you the valves, fittings, pipe and accessories you need. A network of local Branches and Wholesalers, backed by large factory stocks, cooperates to give you faster service.

You save time and trouble when you get everything from Crane. One catalog lists the entire line. **One Responsibility** for all materials . . . brass, iron, steel or alloys . . . helps you to get the best possible installations, avoids needless delays on the job. **One Standard of Quality,** when it's Crane Quality, is your assurance of uniform dependability and durability throughout piping systems.

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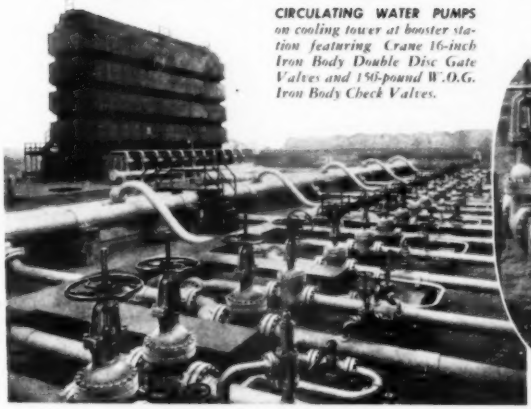
Branches and Wholesalers Serving All Industrial Areas



CIRCULATING WATER PUMPS *on cooling tower at booster station featuring Crane 16-inch Iron Body Double Disc Gate Valves and 150-pound W.O.G. Iron Body Check Valves.*

HIGH PRESSURE ABSORBER MANIFOLD *using Crane 10-inch, 300-pound steel wedge gate valves.*

SUCTION AND DISCHARGE *manifold piping to compressor house at natural gas booster station. The broad Crane Line includes all valves, fittings, pipe and accessories for installations of this type.*

EVERYTHING FROM . . .

VALVES
FITTINGS
PIPE

CRANE

PLUMBING
AND
HEATING

FOR EVERY PIPING SYSTEM

Here's the Lightweight Wrench YOU'VE BEEN WAITING FOR!

FRONTIER ALUMINUM WRENCH

LIGHT WEIGHT

Picture clearly shows light weight feature of new FRONTIER Aluminum Wrench.

The biggest improvement in wrenches since the first wrench was made—that's the new lightweight FRONTIER Pipe Wrench—made from famous, extra-strength 40-E Aluminum Alloy developed by Frontier Bronze Corporation.

Less than half the weight of the ordinary wrench, the new FRONTIER Wrench has the strength to meet and surpass high-standard Government specifications for pipe wrenches.* It's ideal for heavy-duty service on lines, piping and other equipment throughout the oil industry—*easier to handle* in a thousand uses, from well head to distributors' bulk plant!

The new FRONTIER Pipe Wrench has been enthusiastically received by oil production and maintenance crews—many companies have already ordered an additional supply.

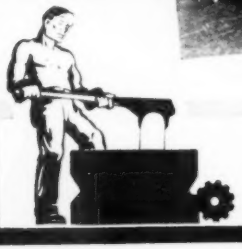
Join the fast-growing list of those who are putting this new lightweight, sturdy pipe wrench to such good use! See your jobber—or write today for full information, and name of nearest distributor.

Available in sizes 36", 24", 18" and 14".

*Government Specification GGG-W-651a.

STURDY

FRONTIER Wrench stands up under heavy usage, as graphically illustrated here, with 215-lb. man exerting full pressure 40" from wrench jaws.



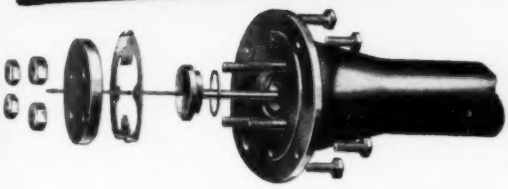
The FRONTIER Pipe Wrench is guaranteed against breakage in normal use.

FRONTIER BRONZE CORPORATION

4877 PACKARD ROAD, NIAGARA FALLS, NEW YORK

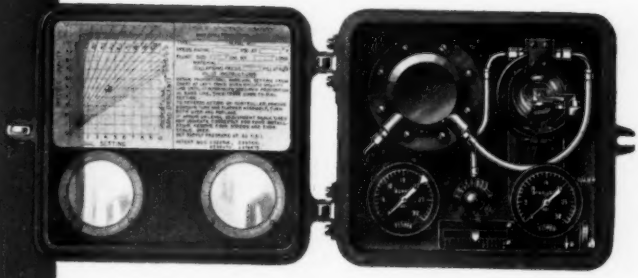
FISHER LEVEL-TROL

REMOVABLE, REPLACEABLE TORQUE TUBE



Type 2405-249 makes it possible for the operator to exchange or replace the torque tube in a Fisher Level-Trol without dismantling the entire level controller or breaking into pressure piping. All Fisher Level-Trols are furnished with this improved feature.

ONLY ONE CONTROL FOR PROPORTIONAL BAND AND SPECIFIC GRAVITY ADJUSTMENT



As easy as tuning a radio. Control knob readily accessible, provided with calibrated scale to indicate setting. Pilot is entirely pneumatic in operation. No intervening links or mechanical joints. High tensile iron, pressure tight, weather proof case with hinged gasket sealed cover.

Type 2405-249 Level-Trol with top and bottom screwed equalizing connections

Write today for Bulletin F-2

FISHER GOVERNOR COMPANY, MARSHALLTOWN, IOWA

It's a HUNT•SPILLER job!

What is GUN IRON?

You'll find all the answers as well as valuable information on other metals and alloys in this interesting metallurgical bulletin. Write for it on your company letterhead. No obligation, of course.

Here at Hunt-Spiller you find quality control that is unique. It is unique because every phase in the production of machined cast parts is performed in our own plant. We produce and alloy the material, Gun Iron, in air furnaces — cast it in our own foundry — even machine the castings in our own manufacturing plant. This is important because it assures you of parts that have accurate physical properties for dependable performance as well as dimensional accuracy.

Typical of the parts that we produce complete are cylinder heads for marine diesel engines (illustrated above). Hunt-Spiller was chosen to produce these complete for three reasons. Gun Iron has proven the most durable material for these parts under high pressures for long periods of operation. At Hunt-Spiller there are craftsmen who can make the most complicated cored casting without defects, and Hunt-Spiller consistently machines castings to specified tolerances.

If you use cast parts that are subjected to frictional wear, pressure, high heat, it will pay you to investigate Gun Iron. For 139 years it has excelled for thousands of such parts in the railroad, diesel, marine, petroleum and metal-working industries. Our engineers stand ready to discuss its physical properties with you in the light of your specific problems.

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Canadian Representatives: Joseph Robb & Co., Ltd., 4050 Namur St., Montreal 16, P. Q.

teamwork

Two types of teamwork play important roles in the engineering and construction of a plant: (1) Internal — within the contractor's own organization, (2) External — between the contractor's and your personnel.

Internal teamwork shows up in records of successful accomplishment, a product of experience in working together on job after job. But the extent of external teamwork is more difficult to predict.

In carrying out its contracts, Lummus assumes a responsibility for giving you the benefit of all that your staff can contribute, as well as our own. We do not lean on your staff for ideas. But neither do we lean away from preferences they express or suggestions they offer. Your Lummus-built plant makes the most of the combined experience of your people and ours.

Economy
Fulfillment
Perspective
Resourcefulness

designs and builds with **TEAMWORK**

Technique

teamwork in process development

In the development of improved methods of producing lubricating oil, Lummus has worked in close-knit cooperation with many leading oil companies. Lummus' exclusive pilot plant equipment for lube-oil process development has been employed to explore process alternatives suggested by these customers, supplementing their own research. More than 85 process units for solvent refining and dewaxing have resulted from this work — including the largest lube-oil plant in the world.

teamwork in plant design

Lummus coordinated its engineering with the requirements and preferences of a leading chemical company — and laid the groundwork for an advanced type of ethylene plant. High yields are being obtained from a wide range of charge stocks. Operating costs are favorable, too.

teamwork in plant construction

Construction in foreign countries and remote locations calls for a close relationship at the site between Lummus' personnel and oil company field forces. Assignment of men with a thorough knowledge of the region, its customs, laws and labor regulations, helps maintain this local cooperation. Records are maintained in accordance with client requirements for progress reports and cost control.

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LUMMUS

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for the big job
...or the small

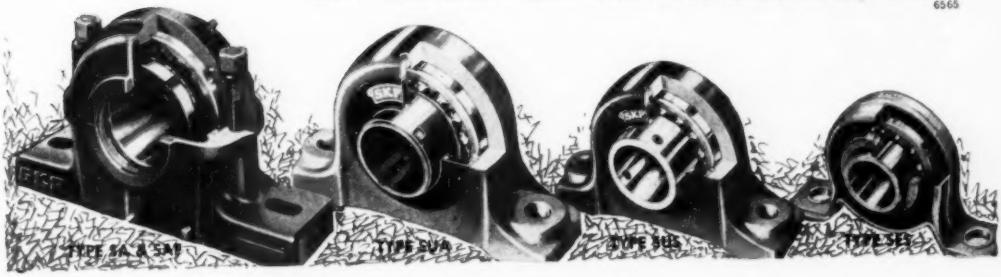
there's an SKF pillow block for every application

SKF Spherical Roller Bearing Pillow Blocks, in a wide range of standard sizes, are designed for bearing protection under various loads and speeds.

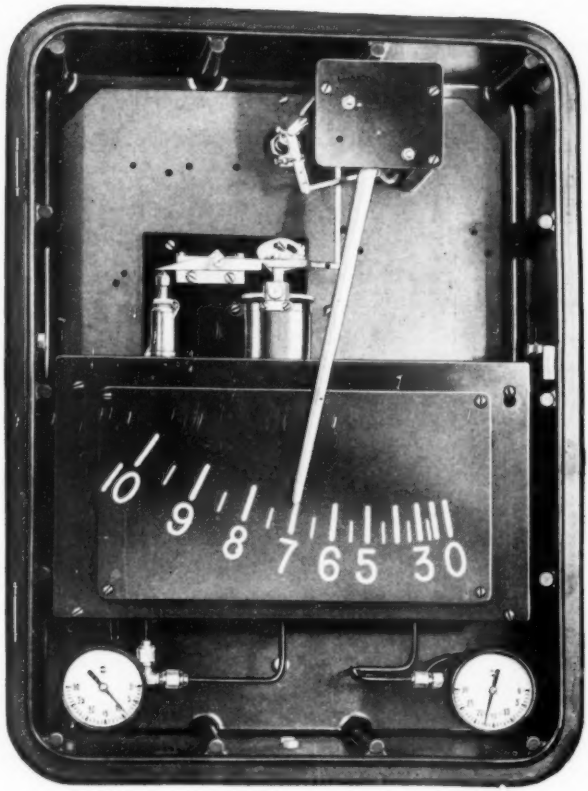
In industrial and marine equipment of all kinds, they keep SKF Bearings rolling smoothly, continuously and economically . . . seal the bearings against dust, scale and water . . . send maintenance costs 'way down.

To insure long trouble-free operation, specify SKF Bearings by ordering SKF Pillow Blocks to match. SKF Industries, Inc., Philadelphia 32, Pa.

6565



8 STAR SERVICE-FEATURES PNEUMATIC



1. **NO NEED TO BREAK TUBING CONNECTION** for nozzle adjustment.

2. **INSTRUMENT CAN BE REVERSED** by shifting one link without disturbing other adjustments.

3. **LINKAGE ALIGNMENT MADE EASY IN FIELD** with positioning device.

4. **MAXIMUM PROPORTIONAL BAND CHANGES** with minimum output pressure changes.

Many maintenance and servicing problems are answered with completely new design-concepts in this A-88 pneumatic Transmitter and Controller, operating on the standard 3-15 psi air pressure range.

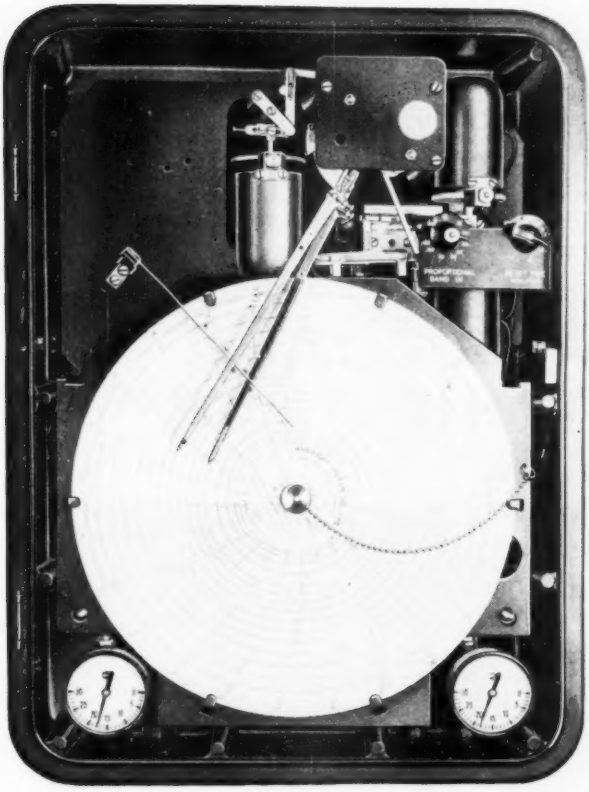
A new minimum of pivot points is achieved through the reduction of moving parts. There is complete accessibility to all adjustments.

These features not only reduce servicing demands and maintenance expense, but contribute greater ease of adaptability to the control of flow, pressure, liquid level, and specific gravity.

The new die-cast aluminum cases may be fitted into the same panel openings provided for many previous models.

The high degree of interchangeability of parts and sub-assemblies make the new Model A-88 pneumatic Transmitter and Controller readily convertible to changing conditions with a minimum of trouble and expense.

OF THE NEW MODEL A-88 TRANSMITTER AND CONTROLLER



5 **EASY POSITIONING OF NOZZLE** permits widening of proportional band without disconnecting tubing.

6 **DAMPENING DEVICE IN RELAY** insures smooth operation. Primary orifice in relay is self-cleaning.

7 **RESET VALVE IS SPRING-CLOSING** and hermetically sealed with bellows. It is calibrated according to time.

8 **LINEAR ADJUSTMENT** between transmitter and receiver.

FOR COMPLETE INFORMATION

Write for Bulletin CT-49, illustrated to the right. Servicing and Operating Bulletins furnished with each instrument.

See the display at our Booth Numbers 732, 734, 736, National Instruments Conference and Exhibit, St. Louis, September 12-16, 1949.

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INCORPORATED (ESTABLISHED 1836)

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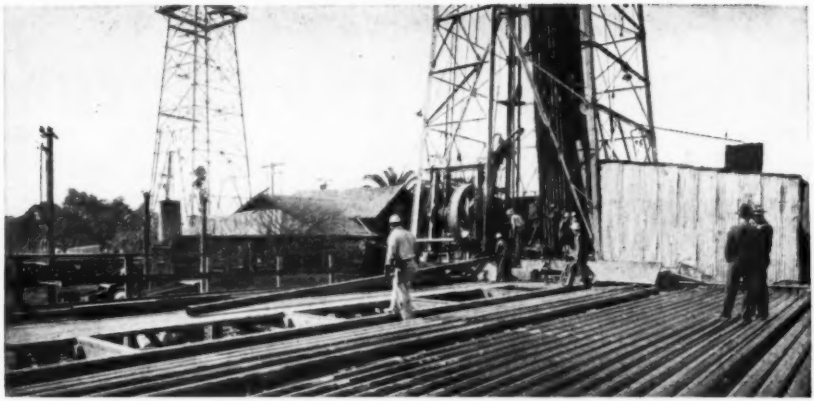
DEPENDABILITY



IN A CALIFORNIA FIELD: Running seven-inch S-80 A. O. Smith Casing.

THROUGH RESEARCH

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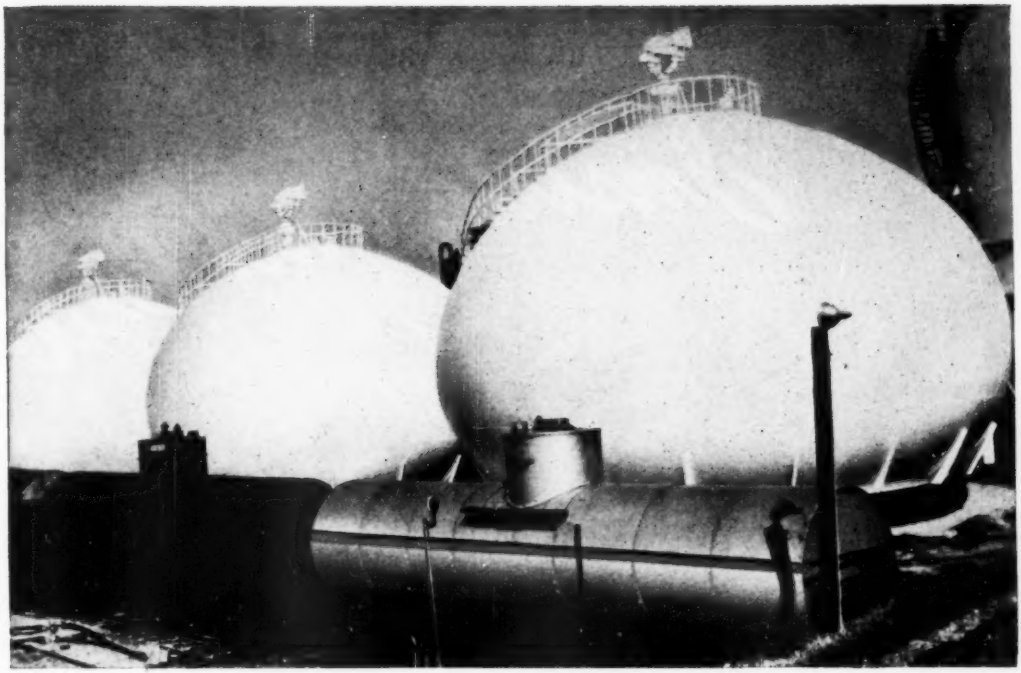

DU PONT DULUX WHITE FOR TANKS

REG. U. S. PAT. OFF.

...cuts evaporation losses

...stays white—cleans itself

...protects for years

To reduce evaporation loss by maintaining lower interior temperatures should be one of the most important functions of a tank finish. Here, Du Pont DULUX White for Tanks is doing an outstanding job on field and bulk storage tanks all over the country. Despite weathering, Du Pont DULUX White for Tanks retains its high heat-reflecting efficiency . . . cleaning itself through controlled "chalking" to stay white for years.

Tough and durable, Du Pont DULUX White for Tanks is formulated especially for the petroleum industry. Its film provides unusual resistance to premature rusting, as well as to the destructive action of the common fumes and gases of industrial areas. For further information, consult your nearest Du Pont representative.

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Please send, free of charge, your new illustrated booklet **"Du Pont DULUX WHITE for Tanks."**

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O-98

Inside and Out

*ELECTRO-GALVANIZED

W. C. NORRIS is now offering Swaged Nipples and Bull Plugs with the exclusive NORRISIZED protection INSIDE, as well as outside, to meet the ever-increasing demand of producers, pipe line operators and refiners.

At no additional cost, this famous corrosion and rust-proof protective armor marks another service to the industry by W. C. NORRIS, the world's largest manufacturer of swaged nipples and bull plugs.

Finest quality seamless steel PLUS precision threading and close dimensional tolerances make W. C. NORRIS your BEST source of supply for Quality Fittings.

FOR COMPLETE SPECIFICATIONS WRITE FOR BULLETIN NO. 31-A

W.C.NORRIS, MANUFACTURER, INC.

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JOURNALLY Speaking

We'll Take Vanilla

THIS department does not vouch for the authenticity of this item, but it was sent in by our Los Angeles editor, who is an engineer and should know, and who raised the possibility that in the future wells may have to be drilled in compliance with the Pure Food and Drug Act.

In a recently completed well in the San Joaquin Valley, Shell Oil Co., Inc., ran a spinner survey instrument to determine the depth at which water was entering the well. The operators were afraid the spinner would become fouled by the heavy crude and sand in the well. So they packed it with Jello. The plan was for the Jello to protect the spinner during the trip down the hole. At the point where it was suspected water was entering, the temperature was high enough to melt the Jello, allowing the spinner to operate in the normal manner.

The Jello didn't work exactly as planned. Portions became separated as the spinner descended, resulting in contamination of the instrument.

So they tried ice cream. The spinner was packed with the dessert and successfully lowered into the hole. After the ice cream melted, the instrument rotated freely and located the point of water entrance.

In spite of the technical success, however, the company ran into one snag which caused it to substitute oleomargarine for future operations. This commodity won't be so subject to sampling by the drilling crews.

Alky-Gas Cycle

OLD TIMERS in the oil business must have a this-is-where-we-came-in feeling over the news from Washington that farm-bloc senators are proposing an investigation into the possibilities of using alcohol from farm products as a motor fuel.

It was just about 20 years ago that alky-gas was a hot political issue. The idea was to impose a stiff federal tax on pure gasoline but exempt motor fuel containing a goodly percentage of alcohol made from grain, and thus provide a market for umpteen millions of bushels of surplus corn and wheat. Congressional candidates campaigned on the issue, farmers made pilgrimages to Washington, and the hearings filled hundreds of pages of committee records.

The bright young New Dealers toyed with the idea briefly, but they soon thought up their own and more grandiose plans for dealing with farm surpluses, and they imposed a federal gasoline tax anyway.

Now the agrarian statesmen are again worried about surplus grains and are again intrigued with the idea that the grain might be turned into alcohol, the alcohol turned into automobile tanks, and the oil industry turned into a joy ride for the farmers.

To coin a phrase, history repeats.

Oil in Celluloid

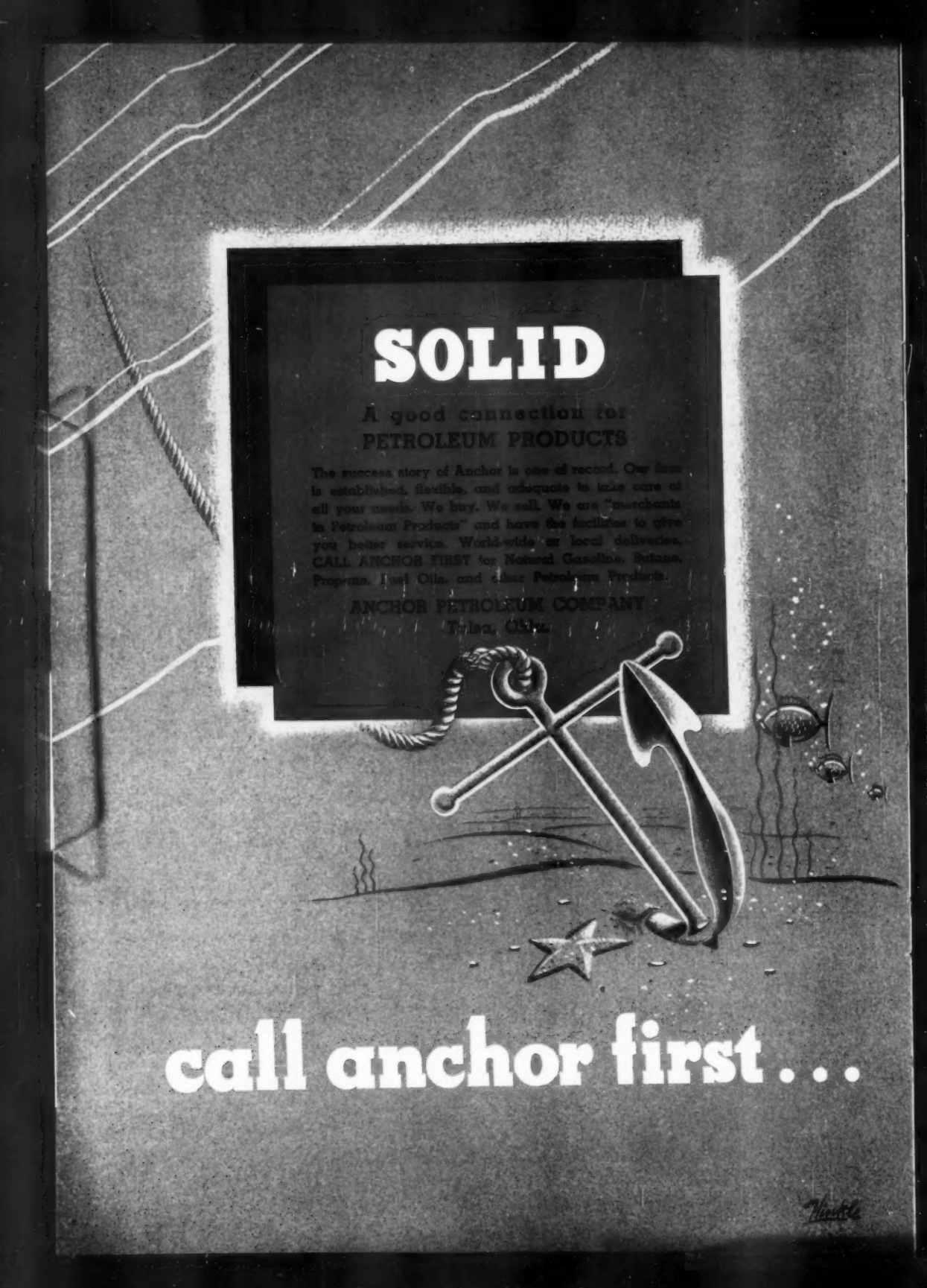
OIL has been discovered in Hollywood, it would appear from the growing number of movies being based on the romance and drama of the oil industry. This department, which is in danger of becoming a movie-review column, has reported on "Tulsa" and "Louisiana Story," and now gets word that a forthcoming epic, "Cable from Arabia," will be woven around the laying of a Middle East pipe line.

You didn't know there were drama and romance in the oil business? Brother, you ought to see what these movie producers can find.

Auto Fact

THE Automobile Manufacturers Association has just issued its new edition of "Automobile Facts and Figures," and the most interesting fact in it is that the United States has three licensed drivers for every two cars. In our neighborhood there are three drivers for every one car, and guess which member of the family has to ride the bus to work.

—*Henry D. Ralph*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the OIL AND GAS JOURNAL

FOUNDED IN 1910 BY PATRICK C. BOYLE

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Protect THOSE LOW-PRESSURE ZONES FROM CEMENT CONTAMINATION

The difficult problem of cementing a string of casing at a predetermined point above the bottom of the hole, while protecting a permeable, low-pressure zone below from cement contamination is successfully being solved by using Baker Triplex Cementing Equipment.

The features of design and construction which insure its successful performance are "tried and true" Baker principles. Baker Metal Petal Baskets have been used universally for years in many types of cementing; and the Baker "Whirler" principle long has been proved superior to jetting action, which may not only fail to prevent channeling, but may wash out cavities with resultant contamination of the cement slurry.

With the Baker Triplex Cementing Shoe (Product No. 136) all cement slurry is directed upward through side whirler ports of the shoe, and a back-pressure valve prevents any return flow of the slurry. The Baker Metal Petal Basket forms a bridge even in large diameter holes; readily conforms to hole irregularities over a wide range of diameters; and prevents the cement slurry from settling in permeable, low-pressure zones below. A Baker Model "G" Casing Centralizer, positioned just above the Triplex Shoe, assists in perfect cementing performance.

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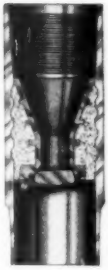
When it is desired to retain cement tailings inside the casing (thus preventing dilution of the cement slurry around and above the Triplex Shoe) either of two collars may be used, *as illustrated below:*

Baker Triplex Cement Baffle Collar (Product No. 137) is used when a stop for the cementing plug is desired, to retain cement tailings inside the casing.



Baker Triplex Flapper Valve Float Collar (Product No. 134 M&F) provides the safety of an additional float valve, as well as a stop for the cementing plug.

Baker Triplex Cementing Shoe, Product No. 136. Named "Triplex" because it performs a "triple" service: (1) is an efficient float shoe for running-in the casing; (2) whirls the cement slurry upward to minimize danger of channeling; (3) Metal Petal Basket expands to form a bridge which prevents cement contamination of low-pressure zones below.

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(A) Baker Triplex Cement Baffle Collar, installed a joint or two above the shoe, serves as a stop for the cementing plug. (B) A hold-down strap retains Baker Metal Petal Basket against the "TRIPLEX" Shoe while running-in. (C) Cementing Ports are covered by Tripping Valve until cementing is commenced. (E) After reaching the desired point in the hole, circulation is established through central passageway. A Tripping Ball is pumped down the hole to seat upon the Tripping Valve. Pressure is applied to shear the Tripping Valve shear screws and force the Tripping Valve downward to expose the cementing ports. (F) Shearing these screws also releases the Basket hold-down strap and allows the Metal Petal Basket to expand against the walls of the hole. (D) A resilient rubber, sleeve-type, back-pressure valve opens readily (see dotted white line) to permit passage of slurry into annulus above. Cementing then is carried out in conventional manner with cement slurry directed upward by the exclusive Baker "Whirling" action. Only readily drillable materials are used for all internal parts.—Look in your BAKER (or Composite) CATALOG, or write to BAKER OIL TOOLS, INC., at Houston, Los Angeles, or New York for complete information.

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THE OIL AND GAS JOURNAL

ECA and Oil

PROBABLY no postwar activity has been more confusing to the American public and its oil industry than has the Economic Cooperation Administration program. Many have withheld criticism because they realized the enormity of the many problems involved in applying a plan which seeks in a short period to bring about world recovery from the major economic and political reactions of the most disastrous war of all time. Some over-all accomplishments can be pointed to and most observers agree that now is not the time to stress the inevitable mistakes.

The ECA petroleum section in a progress report to the National Petroleum Council last week warned that its recovery program for Western Europe might work a hardship on American companies participating in foreign markets. This explanation came a little late to several concerns which already have lost important outlets to competitors in other countries whose operations, in part at least, have been financed by ECA dollars.

But it is with the future of 2 to 10 years from now rather than the present that American and other established operators in foreign areas are concerned. Regarding this there are a few situations that appear controlling.

Because of the oil discovered in the Middle East the Eastern Hemisphere is now rapidly becoming self-sufficient petroleumwise. Transportation facilities, which over the next 1 to 3 years will include large combination tanker-pipe line movements for crude oil, will shortly exceed immediate requirements. Crude runs to stills now greatly exceed prewar levels.

With petroleum the most essential product in European economic recovery, it is understandable that all of the 16 Marshall-plan countries and others would want to strengthen their position as regards supplies. This, several contend, can only be accomplished with refining facilities within their own boundaries. Some countries go still further and are seeking refining capacity two or more times their own needs.

Parts of this planning for the future are wholly unrealistic and spring from a lack of knowledge of how the petroleum industry operates. ECA, to the extent that it is supporting unneeded construction programs, is courting disaster later for those it is most anxious to help. The major job ahead is one of orderly merchandising with expansion coming through the creation of additional uses. To the accomplishment of this end it is far more important to the countries concerned in Europe and elsewhere that they reduce their prohibitive prewar oil taxes and adopt other constructive measures than to build large refinery capacity.

The world oil business is one enterprise that can stand on its feet as it does in this and several other countries. The quicker that ECA recognizes that fact and having accomplished its primary objectives leaves the industry to its own devices the better it will be for all concerned.

Refinery-Yield Pattern Seen as Unsuited to Fall Market Needs

by Henry D. Ralph

THE nation's refinery-yield pattern must be shifted away from gasoline and toward heating oils radically and rapidly during the next few weeks to avoid serious winter difficulties for both refiners and consumers.

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The present market situation is temporary and deceptive. Stocks of heating oils are high because consumers and jobbers have delayed normal summer fillings and the refinery price is less, in some places, than the cost of the crude to make it, while the demand for gasoline is good in comparison and its price makes it the only major product which brings the refiner any profit.

This situation is due for a change. A glance at the charts of product stocks carried in the Journal's statistical section each week (in this issue on page 108) suggests that stocks of all four major products are moving along more or less uniformly above 1948. But this trend can not continue if demand does what is expected.

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Such a yield pattern probably would have been followed except for the high spring inventories of heating oils due to a mild winter and for the fact that consumers and resellers of heating oil have stayed out of the market in droves this summer, resulting in weak prices and high stocks of distillates. This is deceptive. It means that demand is simply being postponed, that deferred demand is piling up faster than stocks. The first fall cold snap will bring a rush that might swamp distribution facilities and make a big hole in stocks. *(See "Apparent Demand Drop Does Not Represent Actual Consumption," The Oil and Gas Journal, May 26, 1949, page 54).*

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Such demands can not be supplied from current yields. Even if refinery runs reach the forecast figure of 5,836,000 bbl. daily, distillate yields of slightly more than 20 per cent will be required during the six winter months. Also, if current estimates of kerosine demand are reached, ker-

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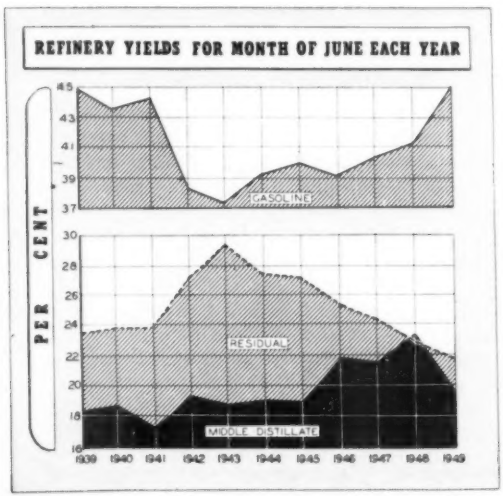

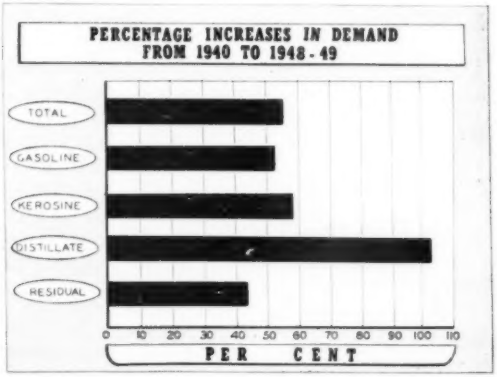

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The supply situation was an unscheduled subject of discussion at the council's midyear meeting, which was devoted chiefly to a review of current conditions since there were only two new matters brought up for consideration.

Acting on requests from Interior Secretary J. A. Krug, the agenda committee recommended, and the council approved, the creation of two committees. One of the committees will make a factual study of petroleum imports, including their effect on the domestic industry, domestic economy, and national security, but in view of the competitive aspects of the problem, will be instructed not to suggest plans or programs but confine its report to findings of fact.

Committees Are Authorized

The other committee will study the problem of providing a substantial domestic reserve capacity against a possible emergency, and again, because of the competitive angle, only the facts are to be brought out, with no recommendations for action. In this instance, however, the subject involves a number of legal questions, including that of conservation, and in order that it may keep out of such fields, the committee will be authorized to appoint a legal advisory subcommittee to deal with those aspects.

The question of imports also was touched upon by Francis McIntyre, retiring acting director of the Office of International Trade, who said the Department of Commerce, in line with its policy of maintaining international trade without barriers and on the basis of available information, does not favor any restrictive controls on oil imports.

Adm. B. B. Biggs, executive secretary of the Munitions Board petroleum committee, and Col. L. E. Cotulla, executive officer of the Armed Services Petroleum Purchasing Agency, told the council that all military requirements for the current year are adequately met and there is no prospect of any shortage anywhere along the line. The two officers commended the industry for its cooperation in meeting a very substantial increase in demand over last year.

Interim reports were filed by the committee on petroleum industry manpower and the committee on personnel for government purposes, the latter stating that it was still considering the problem of securing a director for the Oil and Gas Division and, in addition, now is working on a successor to Walter J. Levy as chief of the petroleum branch of the Economic Cooperation Administration.

Levy, who brought the council up to date on the European Recovery Program, plans to leave the ECA within a month. Currently, he said, he is discussing the refinery program with representatives of the British and Dutch governments and hopes to conclude those talks within a week or two. He will stay on until definite recommendations on the two countries' refinery plans have been made and, after leaving the ECA, will continue to serve as a consultant to Administrator Paul Hoffman.

One of the few formal actions taken by the council was the adoption of a resolution in memoriam to the late Charles F. Roeser, noting the 8 years of service he gave to the Petroleum Industry War Council and the National Petroleum Council.

Reserves Committee Is Appointed by Hallanan

A COMMITTEE on crude petroleum reserve capacity, authorized by the National Petroleum Council, was appointed immediately after the council meeting by Chairman Walter S. Hallanan.

Hallanan said he concurred in the statement of Secretary of the Interior J. A. Krug that formal council consideration of the problem of providing a substantial domestic petroleum reserve productive capacity to be available in the event of an emergency would be greatly in the public interest and of much value to the Government. He named the following to serve on the committee:

L. F. McCollum, Continental Oil Co., Ponca City, Okla., chairman; R. F. Baker, The Texas Co., New York; Hines H. Baker, Humble Oil & Refining Co., Houston; E. F. Bullard, Stanolind Oil & Gas Co., Tulsa; Max W. Ball, petroleum consultant, Washington; F. S. Bryant, Standard Oil Co. of California, San Francisco; E. DeGolyer, DeGolyer & MacNaughton, Dallas; J. C. Donnell, II, Ohio Oil Co., Findlay, Ohio; B. A. Hardey, Shreveport, La.; Fred Shield, San Antonio, Tex.; B. Brewster Jennings, Socony-Vacuum Oil Co., Inc., New York; E. E. Pyles, Jergins Oil Co., Long Beach, Calif.; R. S. Shannon, Pioneer Oil Corp., Denver; Clarendon E. Streeter, Pennsylvania Grade Crude Oil Association, Bradford, Pa.; A. C. Rubel, Union Oil Co. of California, Los Angeles; L. S. Wescoat, Pure Oil Co., Chicago; Robert E. Wilson, Standard Oil Co. (Ind.), Chicago.

Superior Suspends Work At World's Deepest Well

Superior Oil Co. last week announced it has suspended operations at its 1 Pacific Creek Unit, the world's deepest well, in Sublette County, southwestern Wyoming.

The company emphasized that it has not abandoned the well, but declared it has no definite plans for further drilling or testing.

Earlier the company had been reported testing gas shows well above the total depth of 20,521 ft.

Information released by the company showed that two well-known Rocky Mountain producing formations were encountered in the Cretaceous—the Mesaverde at 11,660 ft. (datum of —4,570 ft.) and the Frontier at 19,720 ft. (datum of —12,630 ft.). There were no shows in the Frontier, but some shows of gas-cut mud were found in the Mesaverde.

(A more detailed discussion of the information on the log and tests will be presented in the August 11 issue of The Oil and Gas Journal).

Alberta Oil to Be Topic At Canadian Chemical Meet

"Oil Developments in Alberta," a luncheon address to be presented by M. L. Haider, director of production for Imperial Oil, Ltd., will prove of particular interest to petroleum chemists attending the Montreal regional meeting of American Institute of Chemical Engineers September 6-8. Featuring Canadian chemical progress, the technical sessions of the meeting will deal with developments in the wood pulp, mining, food and other industries.

W. S. Peterson and P. E. Gishler of the National Research Council, Ottawa, will present their findings on fluidized pilot-plant distillation of oil from Alberta bituminous sand. Flow studies of plastic and pseudo-plastic materials, reported in the paper, "Flow of Non-Newtonian Fluids," by George W. Govier and Martin D. Winning, University of Alberta, may prove of interest to engineers studying drilling-mud flow characteristics.

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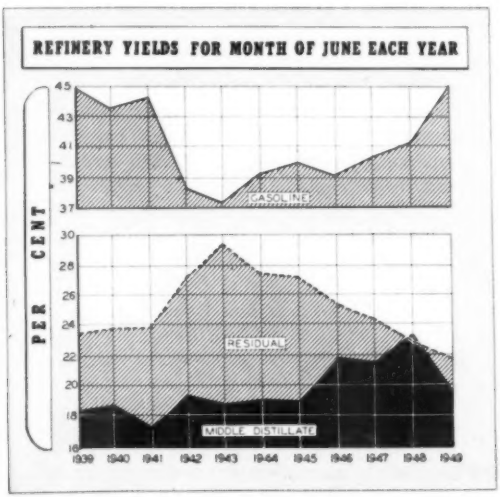

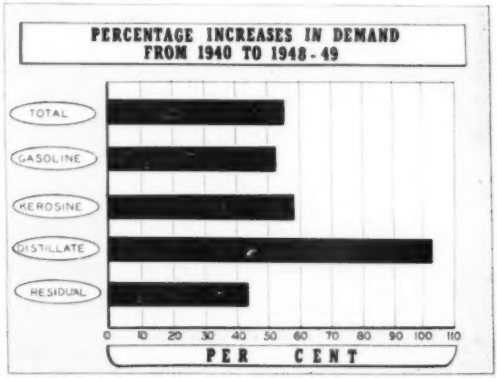

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Adm. B. B. Biggs, executive secretary of the Munitions Board petroleum committee, and Col. L. E. Cotulla, executive officer of the Armed Services Petroleum Purchasing Agency, told the council that all military requirements for the current year are adequately met and there is no prospect of any shortage anywhere along the line. The two officers commended the industry for its cooperation in meeting a very substantial increase in demand over last year.

Interim reports were filed by the committee on petroleum industry manpower and the committee on personnel for government purposes, the latter stating that it was still considering the problem of securing a director for the Oil and Gas Division and, in addition, now is working on a successor to Walter J. Levy as chief of the petroleum branch of the Economic Cooperation Administration.

Levy, who brought the council up to date on the European Recovery Program, plans to leave the ECA within a month. Currently, he said, he is discussing the refinery program with representatives of the British and Dutch governments and hopes to conclude those talks within a week or two. He will stay on until definite recommendations on the two countries' refinery plans have been made and, after leaving the ECA, will continue to serve as a consultant to Administrator Paul Hoffman.

One of the few formal actions taken by the council was the adoption of a resolution in memoriam to the late Charles F. Roeser, noting the 8 years of service he gave to the Petroleum Industry War Council and the National Petroleum Council.

Reserves Committee Is Appointed by Hallanan

A COMMITTEE on crude petroleum reserve capacity, authorized by the National Petroleum Council, was appointed immediately after the council meeting by Chairman Walter S. Hallanan.

Hallanan said he concurred in the statement of Secretary of the Interior J. A. Krug that formal council consideration of the problem of providing a substantial domestic petroleum reserve productive capacity to be available in the event of an emergency would be greatly in the public interest and of much value to the Government. He named the following to serve on the committee:

L. F. McCollum, Continental Oil Co., Ponca City, Okla., chairman; R. F. Baker, The Texas Co., New York; Hines H. Baker, Humble Oil & Refining Co., Houston; E. F. Bullard, Stanolind Oil & Gas Co., Tulsa; Max W. Ball, petroleum consultant, Washington; F. S. Bryant, Standard Oil Co. of California, San Francisco; E. DeGolyer, DeGolyer & MacNaughton, Dallas; J. C. Donnell, II, Ohio Oil Co., Findlay, Ohio; B. A. Hardey, Shreveport, La.; Fred Shield, San Antonio, Tex.; B. Brewster Jennings, Socony-Vacuum Oil Co., Inc., New York; E. E. Pyles, Jergins Oil Co., Long Beach, Calif.; R. S. Shannon, Pioneer Oil Corp., Denver; Clarendon E. Streeter, Pennsylvania Grade Crude Oil Association, Bradford, Pa.; A. C. Rubel, Union Oil Co. of California, Los Angeles; L. S. Wescoat, Pure Oil Co., Chicago; Robert E. Wilson, Standard Oil Co. (Ind.), Chicago.

Superior Suspends Work At World's Deepest Well

Superior Oil Co. last week announced it has suspended operations at its 1 Pacific Creek Unit, the world's deepest well, in Sublette County, southwestern Wyoming.

The company emphasized that it has not abandoned the well, but declared it has no definite plans for further drilling or testing.

Earlier the company had been reported testing gas shows well above the total depth of 20,521 ft.

Information released by the company showed that two well-known Rocky Mountain producing formations were encountered in the Cretaceous—the Mesaverde at 11,660 ft. (datum of —4,570 ft.) and the Frontier at 19,720 ft. (datum of —12,630 ft.). There were no shows in the Frontier, but some shows of gas-cut mud were found in the Mesaverde.

(A more detailed discussion of the information on the log and tests will be presented in the August 11 issue of The Oil and Gas Journal).

Alberta Oil to Be Topic At Canadian Chemical Meet

"Oil Developments in Alberta," a luncheon address to be presented by M. L. Haider, director of production for Imperial Oil, Ltd., will prove of particular interest to petroleum chemists attending the Montreal regional meeting of American Institute of Chemical Engineers September 6-8. Featuring Canadian chemical progress, the technical sessions of the meeting will deal with developments in the wood pulp, mining, food and other industries.

W. S. Peterson and P. E. Gishler of the National Research Council, Ottawa, will present their findings on fluidized pilot-plant distillation of oil from Alberta bituminous sand. Flow studies of plastic and pseudo-plastic materials, reported in the paper, "Flow of Non-Newtonian Fluids," by George W. Govier and Martin D. Winning, University of Alberta, may prove of interest to engineers studying drilling-mud flow characteristics.

A. P. I. Directors Will Maintain Closer Relations With O.I.I.C.

WASHINGTON.—A closer relationship between the American Petroleum Institute and the Oil Industry Information Committee was worked out last week at a 3-day session of the latter, the last day of which was spent with the public relations committee of the A.P.I. board.

At the same time, plans were developed to encourage a more general participation by the industry in the work of the O.I.I.C., and every company and operator will be invited to contribute toward the $1,500,000 budget set up for the current year.

It was the first time since the industry information committee was set up 3 years ago that the A.P.I. board participated in a detailed review of the work.

Following reports of district chairmen on the work and results in various areas, the board members expressed their complete support of the program, which is to be continued through 1950 under the present organizational setup.

In order that the A.P.I. may keep in close touch with the work, it was decided that the O.I.I.C. should make similar reports to the A.P.I. public-relations committee at least twice a year, and from two to five members of the A.P.I. group will sit in on the regular O.I.I.C. meetings as liaison contacts for the full board. This A.P.I. representation was sought by the industry committee in a resolution suggesting that several members of the public-relations committee affiliate themselves with the O.I.I.C. as regular members.

Plans were laid to reconstitute the O.I.I.C next year, with the addition of the district chairmen as full members. This will expand the committee to 35 and provide a closer relationship between national and field activities, it was felt.

The report to the A.P.I. board declared that positive results are being attained by the program, and the public as a whole is being given a more realistic understanding of the industry and its work.

The reports showed that more than 4,000 individuals, 5,000 companies, and 101 trade associations are participating in the program; industry slide films have been shown to almost 2,000 audiences; more than 28,000,000 pieces of informational literature have been distributed; newspapers and magazines with a total circulation in excess of 1,000,000,000 have carried news stories and advertisements dealing with the industry and its products, its good citizenship, and the acceptance of its social responsibilities; and approximately 3,500 speeches have been made by oil men before public groups.

The solicitation of funds from that part of the industry not now participating in the program will be conducted by mail by a group headed by L. S. Wescoat of Pure Oil Co.

Standard of Ohio Spending $30,000,000 To Double Size of Its Lima Refinery

THE $30,000,000 program of Standard Oil Co. (Ohio) for enlargement and modernization of its refinery at Lima, Ohio, is now well under way, with parts of the construction ahead of schedule.

The program, when completed within the year, will approximately double the present crude-oil capacity of 17,500 bbl. daily and increase the rated catalytic and thermal cracking capacity to 27,000 bbl. daily. The refinery, which is one of the oldest of the refining industry, will also have one of the largest and most modern lubricating-oil plants.

The first unit of the new construction to be completed will be a 16,000-bbl. catalytic cracking unit which is expected to be on stream in October. Construction work started a year ago. The new unit, with its stack, towers 195 ft. and is the tallest industrial structure in the state and is higher than the tallest 14-story office building in Lima. The cracking unit is being built by Arthur G. McKee & Co.

The $5,500,000 combination crude distillation and coking unit which will supply part of the feed stock for the catalytic cracker will be completed in February 1950. The third project is a $13,628,000 solvent plant for refining lubricating oils. This new plant, with a capacity of 76,000 gal. daily of finished lubricating oils, will more than double the existing lubricating-oil capacity of the Standard company, which has plants operating at its Cleveland and Toledo refineries. The five units of the Lima lubricating oil plant will provide vacuum distillation, solvent deasphalting, solvent extraction, solvent dewaxing, and clay treating.

The combination crude distillation and coking unit and the solvent deasphalting unit are being built by M. W. Kellogg Co. and the four other units of the lubricating oil plant by Lummus Co.

The expansion of the local refinery and other additions to the Standard of Ohio refineries is tied in with the new pipe line from Texas to Ohio points to be built by Mid-Valley Pipe Line Co., a $56,000,000 project which is jointly owned by Standard of Ohio and Sun Oil Co. The Sun company also operates a large refinery at Toledo.

Board Rejects Humble's Bid for Louisiana Lease

BATON ROUGE.—Louisiana's State Mineral Board accepted bids for mineral leases on 11,671 acres of state-owned land last week and received cash bonuses totaling $361,156, an average of $31.80 per acre.

However, the board rejected the only bid on the largest tract offered at the sale. Humble Oil & Refining Co. made the offer on Marsh Island which lies in the Gulf of Mexico off the coast of Iberia Parish. Humble's bid included a cash bonus of $128,400 and one-sixth royalty plus a one ninety-sixth override on any oil revenues.

Marsh Island has been previously leased to Superior Oil Co. Superior paid a cash bonus of $503,000 about 4 years ago and the 76,700-acre lease expired after the company failed to develop it.

A total of 18 leases were granted by the board for royalties ranging from one-eighth to one-sixth. Union Producing Co. paid the largest bonus when it offered $110,000 for 2,110 acres of water bottoms in Terrebonne Parish. Other leases were in Caddo, Lafourche, Plaquemines, Iberia, St. Mary, Livingston, East Baton Rouge, Calcasieu, and Catahoula parishes.

Mississippi's Oil and Gas Board Convenes August 18

JACKSON.—Public meeting of the Mississippi State Oil and Gas Board will be held here the morning of August 18, and the order of business will include fixing of MERs and allocation of production for Baxterville oil and gas fields.

Also on the docket are proposals for and adopting of special field rules for the two Baxterville fields and for Tinsley oil field. Announcement of the meeting was made by H. M. Morse, secretary and supervisor of the board.

this week

SUPPLIES—The good demand for gasoline is the one bright spot in the refiners' picture, but it may be leading toward trouble. . . . Gasoline yields are the highest in history and production is higher than this portion of the products market justifies. . . . Stocks threaten to be excessive at end of motoring season. . . . ¶Big shift toward heavier yields of heating oils must come soon or sudden consumer demand may put industry in a jam. . . . ¶NPC advises efforts to forestall possible winter shortages of fuel oil. . . .

IMPORTS—Domestic producers intensify their campaign to get government action to curtail oil imports. . . . Building up pressure throughout country to apply to Washington. . . . ¶NPC authorizes committee to study effect of imports on U. S. economy but without power to suggest a program. . . .

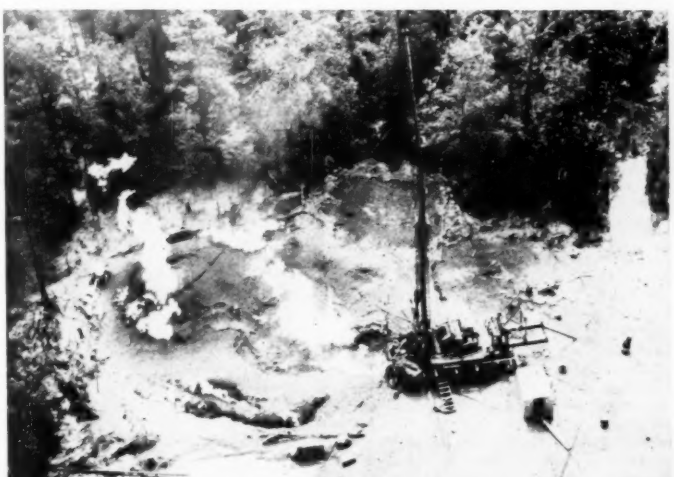
WASHINGTON—Tidelands compromise incorporated in new bill presented Congress. . . . Meets general approval of all concerned except on matter of degree of state management of offshore oil. . . . ¶Administration readying drive on big business. . . . Asks stiffer antitrust laws. . . . Proposes to break big corporations into small competing units. . . . ¶NPC creates committee to report on amount of domestic crude reserves needed for the nation's economy and security. . . .

TRENDS—Total distillate inventories, including primary, reseller, and consumer stocks, may be lower than they were at this time last year. . . . Primary stocks at the end of March were 16,700,000 bbl. above last year, but we have every reason to believe that other stocks were much less. . . . The use trend for nonheating distillates is definitely up—bunker, railroad, and power-plant distillate was up 21 per cent for the first 4 months. . . . Refinery production since the end of March has been 20,000,000 bbl. less than in the same period last year. . . . Total stocks, therefore, must be at least 3,000,000 bbl. less than last year. . . .

INTERNATIONAL—Planned increases in European refining capacity will hit American oil industry hard. . . . Costly adjustments are due. . . . ECA attempting to guide program toward multilateral trade and prevent excess capacity, but European markets may be lost for much of U. S. oil exports. . . . ¶Shell group's report shows big growth in refining capacity outside this continent. . . . ¶Dominican Republic plans refinery. . . . Will export excess products. . . . ¶Ruiz field in Venezuela will get pipe-line outlet. . . .

REFINING—Standard of Ohio spending $30,000,000 to double size of its Lima refinery. . . . ¶Big $55,000,000 expansion project planned by Great Lakes Pipe Line Co. to double products-system capacity will benefit 16 refineries in Kansas and Oklahoma. . . . ¶Bureau of Mines puts first continuous shale-oil refinery in operation. . . .¶California Refining Co. reported planning to double crude-processing capacity at Perth Amboy, N. J., refinery. . . .

PIPE LINES—Salt Lake Pipe Line Co. lets contracts for 320 miles of 8-in. products line from Salt Lake City to Boise, Idaho. . . . First step of 520-mile project to Columbia River near Pasco, Wash. . . . ¶Permission granted by FPC for Tennessee Gas Transmission Co. to carry out $90,000,000 expansion program to increase capacity of its pipe-line system by more than a billion cubic feet of gas daily. . . . ¶Shell Pipe Line Corp. announces plans for 160-mile, 10-in. line from Elk City to Cushing, Okla. . . .



This unusual blowout occurred in Bellevue field, Bossier Parish, Louisiana, when gas escaped through an abandoned Nacatosh well and caught fire and cratered. The drilling well, James Muslow 1 Buckelew et al. 16-19-11w, blew out when perforations were made at 1,886 ft. for production tests after the well had been drilled to 2,877 ft. and pay string set to 2,173 ft. The crater did not damage the new well, and heavy mud and cement were pumped in to stop the gas flow

European Refinery Plans May Be Costly to U. S., NPC Is Told

WASHINGTON. — Costly readjustments may have to be made by the American oil industry to meet the new competitive conditions which will develop as a result of the European Recovery Program, the National Petroleum Council was told last week by Walter J. Levy, chief of the petroleum branch of the Economic Cooperation Administration.

Levy made it clear, however, that ECA is determined that these competitive conditions shall be based in an atmosphere of free trade and will take such steps as it can to counter the closing of markets to American companies by barter or other similar arrangements, such as the agreement recently entered into between Britain and Argentina.

The oil involved in such arrangements will not be considered in evaluating the British program for the expansion of production and refining facilities, he indicated.

ECA Seeking Safeguard

"We have taken the position in ECA that expansion of European oil facilities is justified only to the extent that the output from such facilities can be sold without the use of discriminatory trade or currency practices and without the utilization of other restrictive trade devices," Levy told the council. "We believe that the effort of ECA to establish recovery in Europe should not and must not result in the establishment of 16 small European self-sufficient nations or of nations which intend to trade with one another and the rest of the world mainly on the basis of exclusive, discriminatory bilateral arrangements.

"ECA's policy aims and intentions are thus based on achieving a growing multilateralization of trade, an increasing relaxation of restrictions, and an expanding convertibility of currencies. On the basis of such a concept as applied to oil, ECA does not believe that Europe should save dollars or earn foreign exchange by driving American oil from the European market or from other foreign markets by exclusive bilateral barter arrangements or similar devices; nor does ECA believe that the largest overall dollar savings or foreign exchange earnings could in fact be achieved in this manner. The only European expansion that can justifiably be accepted by the United States Government as part of the recovery program is an expansion in line with truly competitive outlets in the market places of the world."

While the area and extent of the readjustments which the American oil companies may be called upon to make cannot now be predicted because of uncertainties as to how far European facilities will be expanded, Levy suggested that they might involve the sale of oil by the companies in nonsterling areas for sterling, at the same time limiting the convertibility of their sterling income into dollars to an agreed percentage and otherwise establishing their responsibility to spend the rest of their sterling income in nondollar currency areas.

Also, he said, the American industry, which is constructing refineries in the European consuming areas to protect its outlets and minimize the dollar costs for its oil exports to Europe, might also decide to increase procurement in the importing countries of its equipment needs, tankers, and services, which would give those countries a new source of sizable dollar income that could be used to pay for imports of American oil.

Such arrangements, he said, would require complex negotiations between the governments and the companies affected.

Says ERP Aided Exports

Levy explained to the council how the European dollar problem has affected our oil industry and is likely to continue to affect it in the future.

"Without ECA aid, Europe would not have been able to afford during the last year, and could not afford during the next 3 years, to import large quantities of American oil, from either domestic or foreign sources controlled by American companies," he said. "Because of ECA aid, Europe was in fact able during the past year to import very large quantities of American oil. Up to the present, ECA operations have not destroyed, but, rather, have maintained exports of American oil to Europe.

"As far as the future is concerned, Europe, in order to close the dollar gap in its balance-of-payment accounts during the next 3 years, must either increase its exports to dollar areas or reduce its imports from dollar areas, or it must do both. Europe must therefore develop its national resources and production facilities and increase exports to the utmost extent possible. If, after these efforts, Europe is still unable to earn enough to pay for dollar imports at current levels, then its dollar imports must be reduced.

"Applied to oil, we face a situation where Europe owns very large oil reserves in the Middle East and in the

(Continued on page 110)

August Allowables Up In Louisiana, Kansas

LOUISIANA and Kansas have raised crude-oil allowables for the month of August, but Oklahoma Corporation Commission heard recommendations from the state's chief conservation officer that production remain unchanged for the next 60 days.

Louisiana's production was set at 502,000 bbl. daily by the department of conservation, an increase of 2,000 bbl. over July. Estimated net production for August has been set at 483,000 bbl. daily, allowing for underproduction at individual locations and other factors. This increase brings the state's allowable back up near the level of last January.

S. L. Digby, Louisiana conservation commissioner, announced that a public hearing preparatory to setting allowable for September and October will be held on August 11 in New Orleans.

Kansas Corporation Commission set August's allowable at 250,000 bbl. daily, an increase of 5,000 bbl. over July.

In Oklahoma, Walker T. Pound, conservation director, recommended the corporation commission keep the state's production allowable to its present figure, 360,000 bbl. daily, for the next 60 days.

Allowable for New Mexico was set at 132,000 bbl. daily for August, 2,000 bbl. daily below July's figure.

Texas Railroad Commission Clarifies Flare-Gas Order

AUSTIN. — In clarifying a point which has been questioned by producers, Texas Railroad Commission has announced that its flare-gas orders of last December involving 16 of the state's fields apply only to "avoidable waste."

By this clarifying order the commission legally recognizes unpreventable waste such as that due to mechanical failures in gathering systems and gas-producing plants. The order stated in part that "the commission will continue, as in the past, to apply the rule of reason. What we are seeking to accomplish is the prevention of avoidable waste of gas produced with oil. We are seeking beneficial use of this gas formerly wastefully vented to the air by burning in flares."

Coincident with the new order, it was announced that a hearing will be held August 12 on the application of Atlantic Refining Co. for exemption from the flare-gas order for certain wells. Atlantic is asking for an exemption for wells in Seminole field, Gaines County; Goldsmith field, Ector County; and Wasson field, Gaines and Yoakum counties.

Tidelands Compromise Lacks Agreement on Only One Point

WASHINGTON. — Legislation settling the tidelands issue will be introduced in Congress this week, probably even though federal and state officials are unable to agree on the highly controversial question of administration of the submerged oil lands.

The bill, worked out last week in the course of several conferences with Atty. Gen. Tom Clark and Interior Secretary J. A. Krug by House Speaker Sam Rayburn of Texas and with Louisiana, Texas, and California officials, will be sponsored in the Senate by Sen. Joseph C. O'Mahoney of Wyoming, who has been participating in the negotiations, but O'Mahoney reserved the right not to support the measure actively if it contains any provisions which he feels are objectonable.

There was general agreement last week on practically all questions involved in the tidelands situation except that of management, and it is expected this will be worked out in Congress, very likely by the Senate interior committee of which O'Mahoney is chairman and to which the bill is expected to be referred.

Texas Wins Concession

The bill will provide that the coastal states shall retain 62½ per cent of the revenue from the tidelands to a distance of 3 miles, except in the case of Texas, whose officials won, at least temporarily, control for a distance of 10½ miles. Whether this concession to Texas will remain in the legislation, however, is a matter of some doubt.

Beyond the limits of the states' areas, the revenue from the Continental Shelf will be evenly split between the federal Government and the states.

The paramount rights of the federal Government in the offshore lands will be recognized, but the states will be vested with a 62½ per cent interest in the oil within their territorial limits.

The states also will be given undisputed ownership and control of inland waters, and docks, wharves, and other structures in the submerged coastal lands.

The states, further, will exercise police powers over the Continental Shelf, including the right to apply state proration and other conservation laws, tax statutes, and exploration policies.

Texas officials also gained their point with respect to the federal leasing policy to be set up for the Continental Shelf, requiring competitive sealed bids on leases, issuance of leases for a primary term of 5 years, and a 12½ per cent royalty and mimimum rental of $1 per acre per year. But they failed to carry their demand that any legislation be subject to acceptance by the state legislatures.

The bill is not designed to halt the pending suits against Texas and Louisiana, and it has been made clear the states will not lose their day in court if a settlement is worked out. In the event Texas should win its case, it is pointed out, it would mean the state would have 100 per cent of the revenues from the 10½-mile belt along its coast and 50 per cent of that from the area beyond.

As the negotiations, which started in May, neared their conclusion, Krug appeared willing to accept a compromise which initially he had opposed, but in a very off-the-record talk before the National Petroleum Council he was vague as to how far he would go, saying that he was hopeful something could be worked out and that the states' rights should be preserved, but adding that the court had given the federal Government the California tidelands and they should not be taken away from it.

Krug's chief concern, however, appears to lie in the management of the tidelands, which he has insisted should be handled by his department, and whether he will gain his point will depend on his ability to make a persuasive case before the congressional committees which will handle the measure.

NPC Chairman Walter S. Hallanan also expressed the hope a settlement could be reached, pointing out that the present uncertainty is slowing down development and if it continues may pretty much halt operations.

With Congress expected to adjourn within a month, it will be necessary for House and Senate to move quickly if any tidelands legislation is to be enacted this year. However, if the bill is under consideration when the session ends, it will not be killed but will lie over until January.

Stiffer Antitrust Laws, Study of Big Business Are Asked of Congress

WASHINGTON. — The Department of Justice last week urged Congress to stiffen the antitrust laws, among other things increasing the maximum criminal penalty for violation of the Sherman Act from $5,000 to $50,000 and giving the Government as well as private persons the right to collect treble damages for violation of the Sherman and Clayton Acts.

Testifying at House judiciary subcommittee hearings on monopoly power, Herbert A. Bergson, assistant attorney general at the head of the Antitrust Division, disclosed that the current philosophy of the Department of Justice does not consider a corporation evil because of its size, even though it may be so big as to impair efficiency, but does consider it bad when one corporation, alone or in conjunction with two or three others, is in a position so to dominate an industry that there is no longer room for competition — even though that power may not be invoked or may be asserted in a benevolent fashion.

Bergson indicated that the department will go ahead with its program of divorcement, dissolution, and divestiture to break up concentrations of industry, currently involved in the cases against Du Pont, American Telephone & Telegraph, and the "Big Four" packers, among others, but he assured the subcommittee that deconcentration will not be sought until after a careful economic study is made to assure that divorced segments will not starve to death but will remain strong independent enterprises, capable of competing and holding their own.

Two questions for subcommittee study were suggested by Bergson, involving the accumulation of reserves by large corporations. Congress should know, he said, what are the circumstances that have permitted the accumulation of such large profits that some corporations have millions of dollars on hand for investment even after the payment of dividends, and secondly, whether, from the standpoint of economic health, it is a proper function of corporations to use their profits to buy up competitors or other businesses rather than pay those profits to their stockholders for investment by the stockholders themselves.

The huge amount of capital available for investment in the hands of big corporations is, however, only one of the factors contributing to concentration, others being controls over natural resources and raw materials, illegal use of patents and trademarks, and cartels and other agreements and combinations in restraint of trade.

International

WORLD-WIDE OIL DEVELOPMENTS

Shell Group's Refining Capacity Expanding Throughout World

RECENT reports on refinery operations of the Royal Dutch-Shell group outside of continental North America show a continued steady increase in plant-capacity ratings.

Total net capacity gain in 14 of the group's 30 refineries is reported at 34,000 bbl. daily for the 6-month period ended with last year. Of the other 16 refineries, 3 are being rehabilitated and consequently are in nonproductive status and 1 is shut down.

Hence the net total of refineries in operational status are 20, of which 6 are operated to process semifinished stocks such as topped crude oil and various distillates. The other 20 plants are operating on crude oil.

On a capacity basis, these 20 refineries are geared to process 607,300 bbl. per day of crude oil. Capacity of the plants operating on semifinished stocks is 40,600 bbl. daily.

The latest reports on operation of Shell and its associated companies outside of the United States and Canada, supplied by Asiatic Petroleum Corp., are given in the accompanying table. Crude-oil intake to the various refineries was 109,000 bbl. daily net more than the combined rated capacity of the plants involved, due to use of cracking units for crude distillation and other reasons.

Enlargement of the refinery in Rotterdam, the Netherlands, accounted for 21,000 bbl. per day of this capacity; operations in Venezuela accounted for 2,000 bbl. daily; and the plants in Aruba and Curacao made up the balance. The large throughput in both of the refineries in the West Indies was made possible by operating thermal cracking units in crude-distillation service.

The accompanying table shows the location and type of each foreign refinery of the Shell group, listed by operating companies.

Company and Location—	Distillation capacity bbl. per day	Oil intake, bbl. per day	Cracking capacity bbl. per day	Refinery type
Diadema Argentina, S. A. de Petroleo, Buenos Aires, Argentina	13,500	12,300	[3]8,000	S-C
Shell Co. of Australia, Ltd., Clyde, Australia	[6]6,500	[6]6,200		S-A
Akt. Gesellschaft der Shell Floridsdorfer Mineralol-fabrik, Floridsdorfer, Austria	2,000	1,600		S-L-A-W
Belgian Shell Co., S. A., Ghent, Belgium	[2]1,800	[2]1,700		S-L-A
Anglo-Egyptian Oilfields, Ltd., Suez, Egypt	36,000	35,000	6,400	S-C-A
Cie. de Raffinage Shell-Berre, Petit Couronne, France	34,000	32,000	4,700	S-C
Pauillac, France	4,500	4,500		S-A-L
Berre, France	23,500	23,500		S-L-W
Deutsche Shell Akt. Gesellschaft, Reisholz, Germany[4]				S
Wilhelmsburg, Germany[4]				S
Manheim, Germany	1,800	1,800		S
Grasbrook, Germany[5]				L
Harburg, Germany[5]				S-L-A
Shell Koolaj Ressvenytarsaag, Budapest, (Czepel), Hungary	4,000	1,500		S-A-L-W
N. V. de Bataafsche Petr. Mij., Tjepoe, Indonesia[6]				
Wonokramo, Indonesia	2,000	2,000		S-A
Balikpapan, Indonesia	8,500	8,500		S
Pladjoe, Indonesia	70,000	64,000	10,000	S-C
P. Brandan, Indonesia[7]				
Soc. per l'Industria del Petrolio, Spezia, Italy	[2]9,000	[2]7,500	1,500	S-C-A
N. V. de Bataafsche Petroleum Mij., Rotterdam, (Pernia), Netherlands	32,000	[3]53,000	19,000	S-C-A-L
N. V. Curacaosche Petroleum Industrie Mij., Curacao, N. W. I.	200,000	[2]275,000	100,000	S-C-A-L
Arend Petroleum Mij., Aruba, N. W. I.	27,000	[3]42,000	3,000	S
Sarawak Oilfields, Ltd., Lutong, Sarawak	36,000	36,000		S
United British Oilfields of Trinidad, Ltd., Point Fortin, Trinidad	28,000	28,000		S-A
"Shell" Refining & Marketing Co., Ltd., Shellhaven, U. K.	[3]16,600	[3]8,100		L-A
Stanlow, U. K.	[3]16,700	[3]9,200		L-A
Heysham, U. K.	30,000	29,000		S
Ardrossan (Scotland), U. K.	[3]3,500	[3]3,500		A
Shell Caribbean Petroleum Co., San Lorenzo, Venezuela	41,000	43,000		S
Totals	647,900	[7]738,900	152,400	

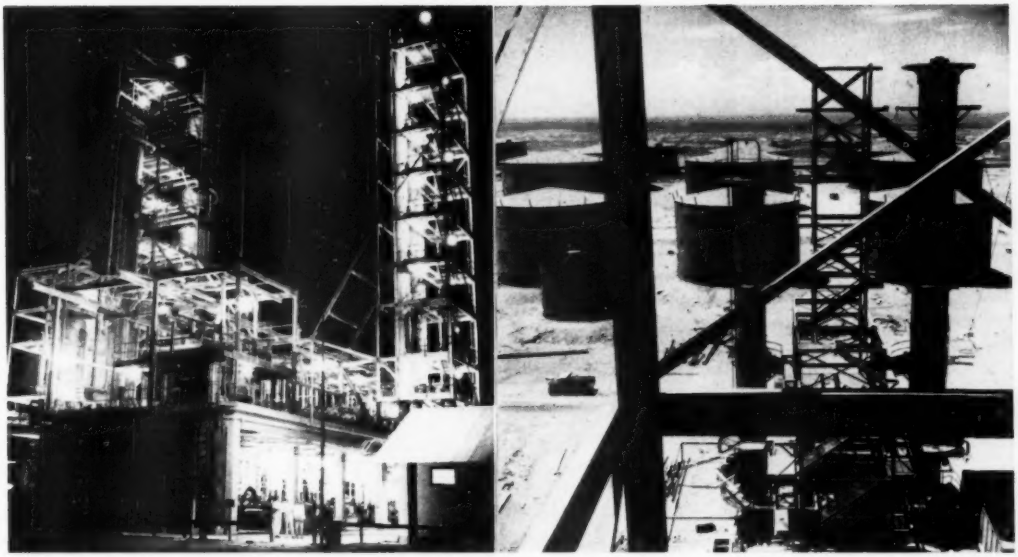
[1]Includes 1,000 bbl. per day topped crude-oil capacity. [2]Topped crude. [3]Includes thermal cracking unit operation as crude-oil distillation unit. [4]Semifinished products processed. [5]Under repairs. [6]Damaged during political disturbances; rehabilitation under way. [7]Shut down [8]Topped crude oil and various distillates. [9]Capacity at beginning of 1949.

Pakistan Embassy Reports Oil Discovery in Punjab

WASHINGTON.—Completion of a successful oil well at Balkassar (West Punjab), Pakistan, was announced here last week through the Pakistan Embassy.

The oil was discovered in test well No. 2 by Burmah Oil Co. (Pakistan Concessions) at a depth of 8,214 ft., which is expected to have a flow of 1,800 to 2,400 bbl. daily.

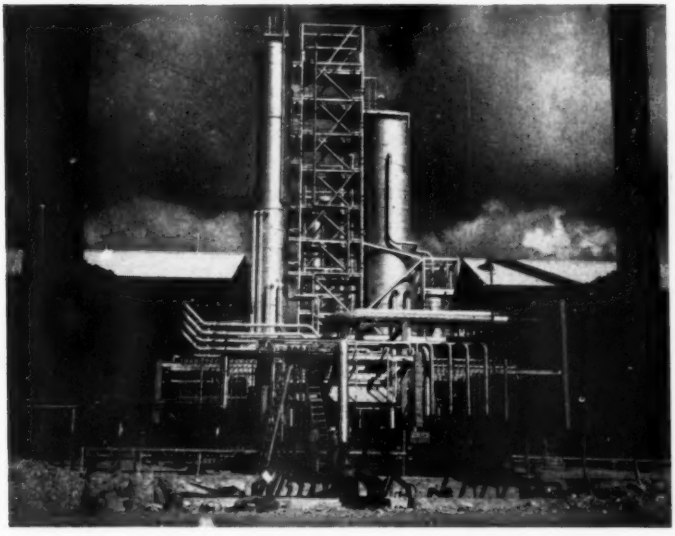
The extent and depth of Balkassar field is yet to be ascertained, but the embassy report said it is likely to produce 50 per cent or more of the total oil requirements of Pakistan.



Left: Night view of the crude-distillation unit at the Shell refinery at Punta Cardon on the Paraguana Peninsula, Venezuela. Right: Reforming unit under construction, showing storage tanks in the background

Shell Will Enlarge Cardon Refinery

Capacity Will Be Increased to 90,000 Bbl. Daily With Addition of Lube-Oil Facilities and an Alkylation Unit



View of the crude-distillation unit showing the heaters, pipe work, and columns

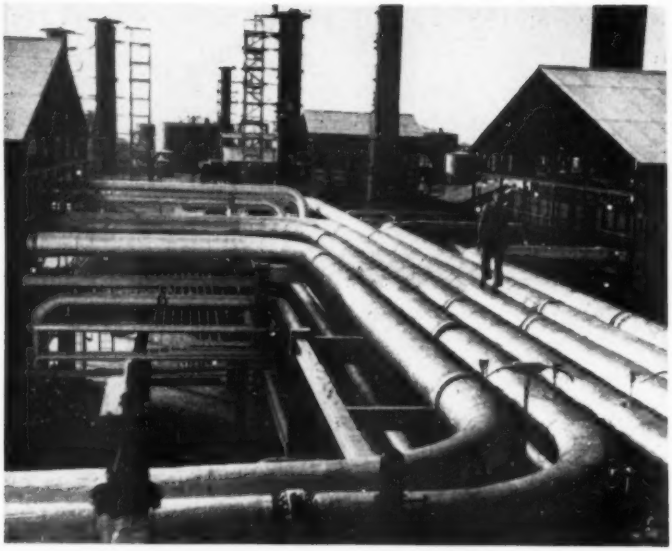
International

NEW construction now planned for the Punta Cardon, Venezuela, refinery of the Royal Dutch-Shell group will increase the refinery's capacity from 50,000 to 90,000 bbl. daily and will send the total cost for the project to approximately $180,000,000.

At present about $150,000,000 has been invested in the Punta Cardon refinery. Refining units already functioning or almost finished include: atmospheric and vacuum distillation, thermal reforming, thermal cracking, gas fractionation, acid treating, doctor treating, phosphate treating, polymerization, and redistillation facilities.

The company now is planning to install another crude-distillation unit, an alkylation unit, and manufacturing facilities for the production of lubricating oils. The new construction will cost an estimated $30,000,000.

Site of the refinery, which began initial operations in February of this year, was purchased by the Shell group 4 years ago.



Overhead piping at the Shell Punta Cardon refinery, typical of thousands of feet of such installations in the huge plant

Since then more than a million tons of cement, steel, and machinery have been imported to build the refinery and the town of 12,000 persons with its clubs, three modern schools in which about 1,400 pupils are being taught, theater, drug store, mechanical laundry and all the other things which make up a modern town.

One of the most difficult and expensive requirements for the town has been a pipe-line project to bring water from the mainland. The project, not as yet completed, has been undertaken jointly by Shell, Creole Petroleum Corp., and the Venezuelan Government. Total cost is estimated at between $6,000,000 and $8,000,000. The line will carry 225,000 bbl. of fresh water daily.

Pending completion of this line, thousands of barrels of water have been transported to Cardon on tankers, and a steam-distillate plant for distillation of salt water also has been in use.

Another large expense required by the building of the refinery on the Paraguana Peninsula was the construction of two modern docks for the handling of materials and for loading and unloading tankers.

To accommodate the crude-oil brought in from producing fields by tanker, 17 large steel tanks with a capacity of more than 1,000,000 bbl. have been constructed.

When Cardon has been completed, products manufactured in the refinery will include liquefied petroleum gas, motor and aviation gasoline, diesel oil, gas oil, fuel oil for industrial use and for bunkering ships, lubricating oils, and asphalt.

To store these products, 107 tanks with a total capacity of 177,000,000 gal. have been constructed.

The company has completed work on a large office building containing 140 air-conditioned offices. In the town of Cardon, it has completed 550 duplexes, or accommodations for 1,100 families, and a hospital staffed by 15 doctors and 28 graduate nurses.

Dispute Complicates Oil Distribution in Korea

WASHINGTON.—A three-way fight is going on over the distribution of petroleum in South Korea, according to reports reaching Washington through the Korean Affairs Institute.

Contestants in the struggle are the American authorities, the South Korea Department of Commerce and Industry, and the South Korea Planning Office.

It is the contention of the American authorities, the reports stated, that petroleum should continue to be handled under the direction of the American distribution agency, the Korea Oil Storage Co., since all oil coming into the area as aid material from the United States is stored by three American oil companies (Standard, Texas, and Rising Sun) under the terms of the economic aid agreement, and it is only logical that it should be distributed by an American agency.

The two Korean governmental agencies are fighting both the American authorities and each other. The Department of Commerce and Industry insists it should receive the petroleum from the companies and detail special sellers to distribute it under department supervision, arguing that there is no over-all supervision exerted over sellers under the American system with the result that there is extensive black-marketing.

The Planning Office claims that all oil should be handled by the Great Korean Petroleum Co., and asserts no satisfactory distribution can be expected of individuals regardless of token supervision by such an agency as the Department of Commerce and Industry.

Refinery to Be Built In Dominican Republic

Plans for construction of a refinery in the Dominican Republic, under consideration for several months, have been given final approval by the Dominican Government.

The project will be financed chiefly by a government-organized company, with participation by International Industrial Consultants, headed by George H. Speirs, which has been assigned the job of handling and operating the refinery and placing the exportable product surplus on the international market.

Site of the refinery has not been chosen, but it will be built in the vicinity of Ciudad Trujillo.

To operate on imported crude, the refinery will have an initial capacity of 5,000 bbl. daily. Additional units are to be expected to have an ultimate capacity of 25,000 bbl. daily.

At present the republic consumes about 2,500 bbl. of products daily, but might rise to 4,500 bbl. daily.

Second Ruiz Well Speeds Plans for New Pipe Line

Pancoastal Oil Co., C. A., announced it has completed a second well on the 12,500-acre Jose Ruiz-3 concession in Eastern Venezuela owned jointly with Venezuela Atlantic Refining Co.

Construction will begin shortly on a pipe line connecting this field to Atlantic's and Pancoastal's producing Tucupido field 24 miles to the north, and two additional drilling rigs will shortly be put on the Ruiz concession.

The discovery well on this concession, completed in early June, produced 745 bbl. per day through a $^{3}/_{8}$-in. choke and the second well, $^{3}/_{4}$ mile east of the discovery well, has been tested at the rate of 826 bbl. per day through a $^{5}/_{8}$-in. choke. The oil is 28° gravity and production is from sands between the 4,400 and 4,600-ft. levels.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Mr. Justice Clark

WASHINGTON.—Elevation of Atty. Gen. Tom C. Clark to a seat on the Supreme Court bench will remove one of the central figures from the tidelands controversy, but otherwise is not expected to affect the course of either the suits now pending against Texas and Louisiana or the compromise legislation which is being worked out.

Clark has had to take much of the blame for the invasion of the states' offshore territories, but he acted under direct instructions from his boss in the White House.

During the efforts to work out compromise legislation, Clark appeared concerned over only one point—the acceptance of the theory laid down by the Supreme Court in the California case of the "paramount" rights of the federal Government in the tidelands. Those rights were admitted in the legislation.

As a member of the Supreme Court, Clark will undoubtedly withdraw from participation in the tidelands cases, in conformity with the tradition that no justice should have any part in deciding an issue in which he was in any way interested prior to his appointment.

Clark's appointment to the highest court caps 12 years of federal service by the 50-year-old attorney general who joined the Department of Justice in 1937 as a special attorney in the Bureau of War Risk Litigation. Thereafter, he was successively special assistant to the attorney general in the Antitrust Division, chief of the division's West Coast offices, coordinator of alien enemy control in the Western Defense Command and chief of the civilian staff for Japanese War Relocation, chief of the war-frauds unit and first assistant to the assistant attorney general in charge of the Antitrust Division, head of the Antitrust Division, and head of the Criminal Division. He was sworn in as attorney general June 29, 1945.

Sore About Severance

THE National Planning Association's recent report to the President's Council of Economic Advisers on the impact of federal policies on the economy of the South is still a sore point with oil and gas men who were members of that organization.

The report wasn't written by the N.P.A. staff but by a couple of Duke University professors with ideas of their own, one being that Texas and Oklahoma would be "blighted areas" when their oil and gas are exhausted and should accumulate a little nest-egg against that day by imposing heavy severance taxes. In fact, it was suggested, if the states didn't act maybe the federal Government ought to impose the levies and earmark the revenues for something like a regional WPA.

While the report wasn't the work of the association, it was brought out under its auspices—something that apparently had happened before. Sen. Robert S. Kerr of Oklahoma saw the report and resigned as a member of the N.P.A. Committee of the South even before it was released, and Frank W. Abrams, chairman of the board of Standard Oil Co. (N.J.) promptly resigned from the board of trustees.

Both men denied vehemently that they had anything to do with the preparation of the report or its presentation under the auspices of the association, and left no doubt that they heartily disapproved of many of the professors' best thoughts.

So far, however, there is no indication that the Council of Economic Advisers will take any precipitate action on the basis of the N.P.A. recommendations and it would appear, now at least, that Texas and Oklahoma are going to be left to figure out for themselves what they're going to use for money when their oil runs out.

Reactionary FPC

THE Federal Power Commission doesn't want to be reorganized—along the lines laid down in the Hoover report or any other way.

In a 34-page report on the Hoover recommendations to the Senate committee, the FPC took specific exception to what it termed a tendency to regard the independent regulatory agencies as part of the executive establishment under the President, and contended that it, at any rate, is an agency of Congress to which has been delegated specific functions.

The commission vigorously opposed suggestions that its gas studies and power and water planning be transferred to other agencies, charging that the recommendation that investigations into natural gas resources be turned over to the Interior Department "is based upon a misconception of the nature and purpose of its work in this field."

One thing the commission particularly doesn't want: to have the President designate its chairman, who would have all administrative responsibility. That would subordinate the other four members of the commission to the chairman; as it is now, all the commissioners are equal and they have had some fine Donnybrooks over natural gas and other subjects.

Boiled down, there wasn't much in the Hoover recommendations that met with the approval of the commission, and much of what was approved could be accomplished, it argued, without legislative or executive action.

But there was one recommendation in which it heartily concurred. The salaries of commissioners, board, and staff members should be increased.

Oil for the Unborn

A GOOD word for the oil industry was spoken last week by Dr. Harold G. Moulton, widely known economist and president of the Brookings Institution.

In a 397-page report on Controlling Factors in Economic Development, Dr. Moulton assailed the idea that the United States is running out of natural sources, and declared the country has the ability to support 300,000,000 people a century from now, on a plane of living eight times as high as that of the present.

He did not say it was certain that the country will achieve such an expansion, but that given wise policies it has the resources to do it.

Dr. Moulton rejected the often-voiced contentions that our minerals and fuels are inadequate, that the country is approaching a static condition, or that the Government must set up a controlled economy.

On the contrary, he asserted, fuel and power resources are abundant, and adequate supplies of oil and gasoline seem assured for many generations to come, partly because of synthetic production from practically unlimited coal reserves.

But, the report warned, whether the country achieves its goals will depend on the type of economic organization that will exist.

"The underlying requirements for a vast expansion of living standards are the same under communism, socialism, hybrid systems, and private enterprise—namely, the conservation and wise use of resources, improving technology and increasing man-hour output, wide distribution of national income, and financial stability," Dr. Moulton said. "Only private enterprise, however, can furnish the imagination, drive, and efficiency essential to maximum progress. Government regulation is essential, but to be compatible with private enterprise it should not assume operational functions."

Coal Man Supports Producers In Fight Against Oil Imports

WASHINGTON. — Protests against the current high level of imports of foreign petroleum continue to mount in Washington, and last week the coal industry joined with domestic oil producers in their fight against petroleum imports.

The current heavy receipts of foreign oil are discouraging interest in research on production of synthetic liquid fuels from coal, the Senate banking committee was told by George Love, president of Pittsburgh Consolidation Coal Co., which is engaged in such a program in cooperation with Standard Oil Development Co.

"It doesn't make economic sense to make oil out of coal when oil is replacing coal under boilers," Love said, in discussing the situation.

The competition of oil and gas is taking from coal markets which can never be recovered, Love testified, charging that the importation of foreign oil to replace coal is unsound and uneconomic.

In a report to President Fred W. Shield, Russell B. Brown, general counsel of the Independent Petroleum Association of America, declared that "domestic industry is in a fight for its life against a combination of powerful companies operating in the international field."

Brown Blasts Importers

"Their attitude and their recent public expressions show that they are without compunction as to the effect of their import policy on the domestic oil industry," Brown added. "If their own subsidiaries in the United States are affected, they are not averse to that, either. The properties here have the protection of laws and the judicial enforcement thereof. They can be operated at low rates without fear of confiscation."

Brown reported that while the recent I.P.A.A. meetings were helpful through the discussions of the problem, "we should be prepared in our minds for a long and probably a bitter contest to get the proper boundaries set on imports."

Rep. Paul J. Kilday of Texas joined the argument with the assertion that the domestic oil industry is losing more than $2,000,000 a day as a result of the reciprocal - trade - agreements program. This situation must be corrected if President Truman's program for expansion of the production of goods and commodities be increased to avoid a recession, Kilday told the House.

Kilday charged that the importing companies through "various ingenious devices" in the form of subsidiary companies, are siphoning vast amounts of income away from our domestic economy.

"It has already been brought out in congressional hearings that there has been an avoidance of taxes to the federal Government on earnings which were made by selling foreign oil to the armed services," he said. "The effect is disastrous to thousands of independent operators in this country."

Pointing out that the domestic industry has started to tighten its belt, cutting back on future drilling programs and curtailing operations, Kilday asserted that if the administration fails to act, Congress "should attend to it that the correction applies not only to future trade agreements but to all that are now in force."

Public Land Offices in Montana Are Consolidated

WASHINGTON.—The Interior Department extended its consolidation program for field offices to Montana this week, closing the district land office at Great Falls and centralizing all public-land case work in the state at the office in Billings.

Under the consolidation program, central offices are being established in the public-land states, each to provide state-wide service to the users of federal public lands. There are more than 5,200,000 acres of such lands in Montana.

Claims of Economy in Use Of Gas by AEC Challenged

WASHINGTON.—Claims of Atomic Energy Commission officials that conversion of the Oak Ridge, Tenn., atomic-energy plant from coal to natural gas would save the Government $1,250,000 a year have been challenged by Tom J. McGrath of the Fuels Research Council.

In a letter to Sen. Brien McMahon of Connecticut, chairman of the Joint Atomic Energy Committee, McGrath asserted that on the basis of coal prices currently quoted to the AEC natural gas would cost 3.8 cents more than coal per million B.t.u.

McGrath said that recent bids for supplying coal to the Oak Ridge plant brought a price of $4.50 per ton delivered and the AEC figures handling and firing charges at the plant at 24 cents per ton. The specifications call for coal possessing a calorific value of 13,200 B.t.u. per pound, on the basis of which the cost of coal used as fuel would be 17.95 cents per million B.t.u. The equivalent cost for gas would be 21.75 cents, he said.

Next Week

First offshore pipe line to be constructed in the current drilling boom in the Gulf of Mexico is described by Leigh S. McCaslin, Jr., of the Journal staff. This line, laid by The California Co., is nearly 3 miles long with its offshore terminus installed on the platform used in drilling California Co.'s first well in Bay Marchand field.

A new compression plant for handling 6,000,000 cu. ft. per day of gas has recently been completed in Southwest Texas by Southern Minerals Corp. This plant, thought to be the largest of its kind in service in the United States, uses portable compressor equipment. D. H. Stormont, district editor, includes interesting information in his article on this plant.

Cooling water system installed in the West Monroe, La., plant of Tennessee Gas Transmission Co. is discussed by W. A. Wiss, company plant-results engineer. The flow scheme for the combination hot and cold water system is illustrated and clearly described.

Corrosion of oil-refining equipment, an article by Henry P. Zeh, Standard Oil Co. of California, presents detailed information on corrosion studies.

Pressure drilling in Iran is the title of the second article in the series by W. H. Lane, on modern drilling and production practices in the oil fields of South Iran. The illustrations accompanying this article incorporate the important equipment items used in the operations discussed.

A catalytic unit operated by Wood River Oil & Refining Co. at its Hartford, Ill., refinery is reported on by R. B. Tuttle, associate editor. Results on four different test runs which were conducted to determine the unit's flexibility are presented in tabular form.

Neutralizing agents for condensate-well corrosion control describes laboratory apparatus designed for pH determinations. From studies the author, D. A. Shock, Continental Oil Co., concludes that various neutralizing agents are suitable for corrosion control.

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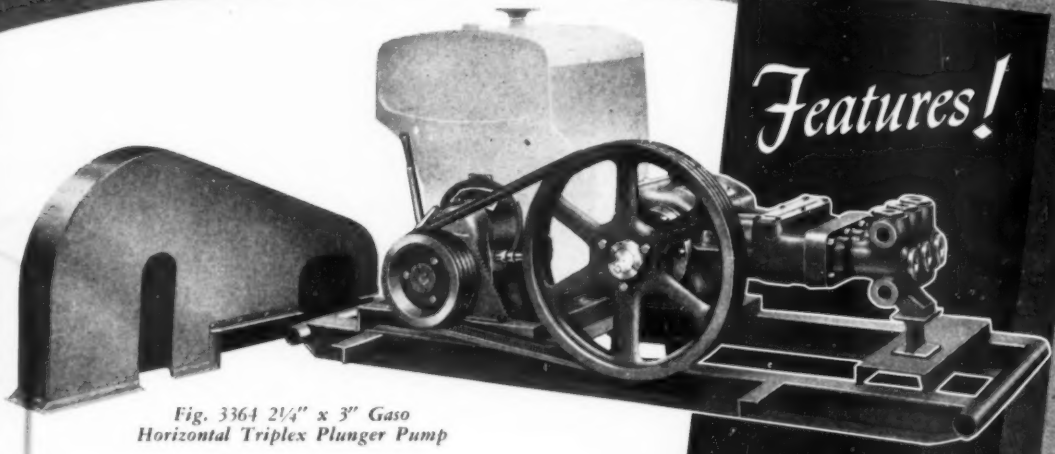

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Capacity up to 44 barrels per hour at 900 pounds working pressure. Gaso economy and dependability.

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Fig. 3364 is available as a complete and self-contained pumping unit, with any type of engine or motor that the customer may specify.

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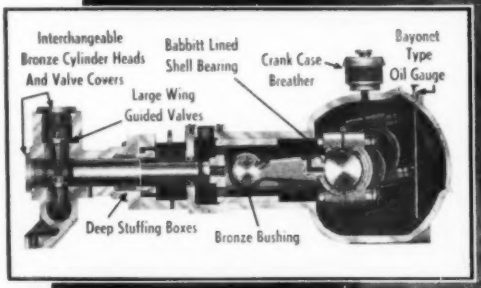

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Bruce K. Brown to Head Pan-Am Southern Corp.

WITH THE MERGER OF PAN American Petroleum Corp. of New Orleans and its subsidiary, Root Petroleum Co., Shreveport, into a company to be known as Pan-Am Southern Corp., Bruce K. Brown, now president of Pan American Petroleum, will become president of Pan-Am Southern. Merger of the two firms was voted by the boards of directors last week and stockholders will ratify the consolidation August 23.

Brown will sever his connections as vice president and director of Standard Oil Co. (Ind.) and move to New Orleans where he will manage the new firm. Dwight F. Benton, president of Root Petroleum, will be advanced to another position with Indiana Standard, the parent company. Pan-Am Southern's exploration, producing, purchasing, and pipeline activities will continue to be directed from Shreveport.

A graduate of University of Illinois, Brown joined Indiana Standard in 1929 as general patent attorney. He later advanced to manager of the development and patent department and in 1938 was promoted to general manager of research and development. He supervised the firm's research activities at its refinery laboratories, and in April 1940 was elected a member of the board of directors.

Don R. Ford has been appointed assistant manager of Magnolia Pipe Line Co. at Dallas, transferring from Houston, where he served as superintendent of the southern division. Ford joined Magnolia in 1927 and served as a pipe liner, district gager, chief gager, supervisor, and superintendent. He is being replaced in Houston by **O. H. Beshell,** who has been superintendent of the western division at Midland, Tex. **Malcolm E. Powell** has been promoted from assistant superintendent, northern division, at Oklahoma City to superintendent of the western division at Midland; and **A. D. Pike,** assistant district superintendent at Little Rock, Ark., has been advanced to superintendent of the Little Rock district.

E. E. Smith, production foreman for Continental Oil Co. at Westlake, La., has been moved to the Billings, Mont., area.

E. C. Bothwell has been elected to board of directors of Gulf Oil Corp. in Pittsburgh. He has been a vice president of the firm since 1935, in charge of production and exploration activities, including overseas areas. He will serve as a member of the company's finance committee in his new appointment. **K. C. Heald** will handle the company's production and exploration activities in the United States and Canada and will assist Bothwell with respect to overseas operations. He has been a Gulf vice president since 1945.

Charles D. Browder, field engineer, Standard Oil & Gas Co., Alvin, Tex., has been transferred to the Houston division office as a petroleum engineer. Other transfers include: **James V. Witt** and **Ernest L. Frye,** moved from the Tulsa general office to Burnell-North Pettus plant, Pettus, Tex., as head roustabouts; **Howard M. Thompson,** drilling-research engineer, transferred from Tulsa to Houston; **Guy H. Johnston,** promoted from senior mechanical engineer at Houston to assistant division engineer; **James L. Guy,** advanced from architectural engineer, to senior mechanical engineer, Houston; **Garland W. Bennett,** moved from operating engineer at the Luby gasoline plant, Bishop, Tex., to plant engineer at South Jennings recycling plant, Jennings, La.; and **Jack E. Whiting,** transferred from Southwest Texas district, Corpus Christi, to the Anse La Butte area, Lafayette, La., as mud engineer.

Darrell Chandler, former district engineer for Sun Oil Co. at Sea Breeze, Tex., has been transferred to the company's production department at Beaumont, Tex., and **John Scharnberg,** engineer at Vegan, La., has been transferred to Sea Breeze.

Robert Siegel, president and general manager, Socony-Vacuum Oil Co. of Venezuela, who was transferred to New York City from Venezuela in March, has been named manager of the foreign producing department of Socony-Vacuum Oil Co., Inc. **F. W. Bartlett** has been named general assistant to **J. C. Case,** director in charge of producing.

R. L. Enyert has joined Shell Oil Co., Inc., in the Houston office as geologist in the exploration department, and **G. L. Yonkman,** exploration and production laboratory, has been transferred to the regional staff in the gasoline department, Houston.

Fred H. Wilcox, assistant chief geologist for Magnolia Petroleum Co., Dallas, has been transferred to the parent company, Socony-Vacuum Oil Co., Inc., in New York City, where he will serve as coordinator of domestic production. He joined Magnolia in 1934, and previously was with Vacuum Oil Co. in Houston. In 1944 he was promoted to assistant chief geologist for Magnolia, being transferred from Midland, Tex., where he served as district geologist.

James R. Cameron, formerly chemical engineer for Stanolind Oil & Gas Co., has resigned to join the research staff of Battelle Institute, Columbus, Ohio.

R. P. Huggins, Western Gulf Oil Co., has been named president of the newly established Los Angeles Petroleum Club. Other officers include: **Henry Salvatori,** Western Geophysical Co., vice president; **S. I. Williams,** Pike Drilling Co., secretary; and **Howard C. Pyle,** Continental Consolidated Corp., treasurer. Directors of the group include: **Mortimer Kline,** attorney; **James G. Leovy,** Western

H. SALVATORI

R. P. HUGGINS

Gulf Oil Co.; **Frank A. Morgan,** Richfield Oil Corp.; **R. W. Sherman,** consultant; **O. I. Torkelsen,** British American Oil Producing Co., and **Thomas Sherman,** Huntington State Co. The club opened its quarters on the third floor of the Biltmore Hotel on August

PERSONALS

S. I. WILLIAMS

H. C. PYLE

1 and at present membership stands at 350. Huggins stated that except for a limited number of nonresidents, size of present quarters prevent increasing membership.

John L. Stoops, who recently completed work on his B. S. degree in geology, has rejoined Tide Water Associated Oil Co. as a geologist in the Tulsa office. He previously served with the company at Midland, Tex., and was granted an educational leave upon his discharge from the armed forces. The company also reported that **Herman E. Wendt,** recent graduate in petroleum engineering at Texas A. & M. College, has joined the firm as an engineer at Hobbs, N. M.; **William H. McPhail,** engineer, has been transferred from the Houston office to the North Central Texas district; and **Clyde E. Scott,** mechanical engineer formerly with J. E. Crosbie, Inc., has been employed at the Drumright, Okla., refinery in the inspection department. McPhail recently completed work on his petroleum-engineering degree at University of Houston.

Fred L. Nabors, petroleum engineer for Stanolind Oil & Gas Co. at Lubbock, Tex., has been transferred to the division office at Fort Worth. Other transfers include: **Ben F. Phillips,** material supervisor, moved from the Hogback area at Farmington, N. M., to the Slaughter area, Brownfield, Tex.; **Frederick W. Foell,** transferred to Fort Worth as mechanical engineer from the West Texas district at Midland, where he served as petroleum engineer; **Eugene M. Knight,** petroleum engineer, transferred to the West Texas district at Midland from Hendrick area, Wink, Tex.; and **John R. Feeser,** moved to the Hendrick area at Wink as field engineer, from the Slaughter area at Brownfield, Tex.

K. A. Olson, geologist for Phillips Petroleum Co. at Denver, has been transferred to the company's newly opened offices in Calgary, Alta., Canada.

Harry W. Brennan, Jr., Midland, Tex., has joined the staff of **John Byram,** independent geologist and oil operator at Abilene, Tex., where he will be in charge of engineering work. He was formerly district manager for Core Laboratories, Inc.

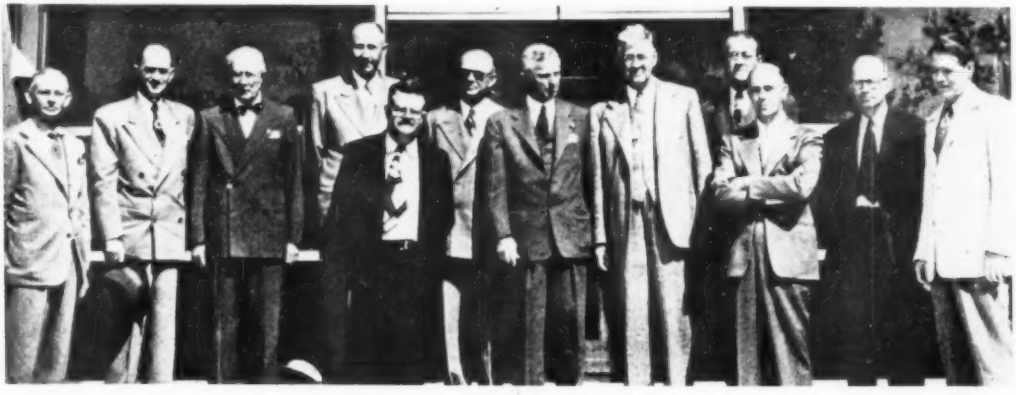
Jimmie B. Short, driller for Superior Oil Co. at Elk City, Okla., has been transferred to the Kingfisher, Okla., area.

P. L. Terrasson, assistant seismologist for Shell Oil Co., Inc., at Barrhead, Alta., Canada, has been transferred to Corpus Christi in the same capacity.

Horry F. Prioleau, senior vice president and director of Creole Petroleum Corp., has rejoined Standard-Vacuum Oil Co. as a director and vice president. Prior to World War II Prioleau was general manager of Standard-Vacuum's subsidiary in The Hague. He went to The Hague in 1929 and became general manager for Standard-Vacuum Petroleum Maatschappij in 1934. Forced out by the German occupation of Holland in 1940, he returned to the United States, joining Creole in 1943 as assistant to the president. He was elected a vice president and director of that company in 1944.

John Blixt, geologist for The Texas Co. in Montana for the past 15 years, has been transferred to Casper where he will serve as geologist for Wyoming. He will be succeeded in Montana by **Ken Parsons.**

James R. Montgomery, senior civil engineer for Humble Oil & Refining Co. in the gas-construction division, has been transferred to Tyler, Tex., where he will be engaged in construction for the company's East Texas division.



Officials of Gulf Oil Corp. at recent opening of the newly completed chemical and geological laboratory section for the production and pipe-line departments at Houston, which will serve the Houston division. Left to right: Paul Leavenworth, chief geologist; D. S. Scott and Dr. F. M. Seibert, assistants to the vice president; George H. Lacy, chief engineer; Dr. M. A. Hanna, chief paleontologist; H. B. Fuqua, assistant to the vice president; J. H. Russell, vice president, Gulf Oil Corp. and Gulf Refining Co.; Ben C. Belt, assistant to the vice president; R. R. Striekert, chief draftsman; W. F. Rogers, chief chemist; George B. Lamb, assistant chief geophysicist; and W. H. Akkerman, civil engineer. The laboratory will supplement the central research and development laboratories at Harmarsville, Pa.

E. M. Robbins, recent graduate of the Colorado School of Mines at Golden, has joined Sinclair Oil & Gas Co. at Casper, Wyo., as a geologist.

H. W. ROSS

H. W. Ross, assistant to the vice president, Sohio Petroleum Co., Tulsa, has arrived in Calgary, Alta, Canada, where he will serve as general manager of the Sohio group's Canadian operations. **John Hyatt** has been named chief geologist for the area and will have headquarters in Calgary; **W. H. Strickler** has been named assistant manager based at Regina, Sask.; and **B. M. Abbott** has been appointed chief accountant, headquartered at Regina.

C. D. Mims, division petroleum engineer at Houston for Stanolind Oil & Gas Co., has been transferred to Snyder, Tex., where he will serve as foreman of drilling and production for the North Snyder field.

Cary C. Morgan, Jr., formerly assistant cost estimator in the Tulsa office for Stanolind Oil & Gas Co., has been named assistant mechanical engineer of the company's Salt Creek natural-gasoline plant, Midwest, Wyo.

I. R. Kosloff, who has served as special assistant to the president, Richfield Oil Corp., has been named a petroleum adviser to the Israeli government at Tel-Aviv, Israel.

John E. Nelson, executive vice president of Gulf Oil Corp., Pittsburgh, will retire on September 1. He served at one time as secretary to the late Andrew W. Mellon, one of the founders of Gulf Oil.

John R. Lynn, Carter Oil Co. geologist at Buffalo, Wyo., has been transferred to the Manhattan, Kans., region in the same capacity.

Richard L. Fedell, Smackover, Ark., engineer for Phillips Petroleum Co., is now stationed as an engineer at Rangely, Colo.

G. D. Reavis, geologist for Bay Petroleum Co. at Ardmore, Okla., has been moved to the Oklahoma City area.

Harry H. Mack, Tulsa, formerly production vice president for Sunray Oil Corp., has been named production manager for the holdings of **Russell Maguire,** New York City, in Texas, Mississippi, Oklahoma, and Kansas areas. He has established temporary headquarters in Wichita Falls, Tex., where he will be assisted by **H. E. Cline,** who has been drilling superintendent for Maguire in North Texas. Mack formerly served as general production superintendent for Sunray, and in 1940 was named vice president in charge of production.

Darl D. Gillespie, Jr., senior petroleum engineer at Oklahoma City for Stanolind Oil & Gas Co., has been promoted to assistant division engineer of the Oklahoma City division. **Charles B. Snyder,** field superintendent at Zenith, Kans., has been transferred to the Gorham, Kans., area in the same position.

A. B. Allardyce, Jr., geologist for Stanolind Oil & Gas Co., has resigned to join the Ralph Lowe organization in Casper, Wyo., as a geologist.

Glenn G. Sleight, Sun Oil Co., Mount Pleasant, Mich., has been elected president of the Michigan Geological Society.

C. D. Wixon has been named general sales manager for Mid-Continent Petroleum Corp.; **M. H. Duffield** has been named manager of wholesale sales, and **A. L. McCarthy** has been appointed assistant wholesale-sales manager, **T. E. Fitzgerald,** marketing vice president, announced.

SHIFTS—

Eugene M. Knight, engineer, Stanolind Oil & Gas Co., Wink to Midland, Tex.; **David Fisher,** engineer, Pan American Production Co., Easton, La., to Baltimore, Md.; **V. V. Thomasson,** superintendent, Barnsdall Oil Co., Shreveport, La., to Bronte, Tex.; **Warren Woolley,** Advance Refining Co., Centralia, Ill., to Woodbury, N. J.; **Wilson C. Spicer,** Carter Oil Co., Mount Vernon, Ind., to Bowling Green, Ky.; **Arthur D. Fox,** engineer, Sun Oil Co., Inc., Robards to Henderson, Ky.; **John A. Van Auken,** engineer, Marine Exploration Co., Forest to Laurel, Miss.

John G. Jackson, engineer, Humble Oil & Refining Co., Pascagoula, Miss., to Harvey, La.; **Carl L. Keys,** Slick-Urschel Oil Co., Valley, Miss., to Rankin, Tex.; **S. T. Shiang,** refinery engineer, Universal Oil Products Co., Flaral Park to New York City; **Charles E. Starr,** engineer, Coral Gables Gas Co., Larchmont, N. Y., to Miami, Fla.; **Franklin D. Priebe,** engineer, Cities Service Oil Co., Russell, Kans., to Odessa, Tex.; **Paul Quillin,** engineer, Sohio Petroleum Co., Russell, Kans., to Novice, Tex.

George W. Tracy, engineer, Stanolind Oil & Gas Co., Tulsa to Midland, Tex.; **G. D. Reavis,** geologist, Carter Oil Co., Ardmore to Oklahoma City; **Marsh S. Watson, Jr.,** engineer, The Texas Co., Norman, Okla., to Plainview, Tex.; **Paul L. Terrasson,** geologist, Shell Oil Co., Inc., Barrhead, Alta., Canada, to Corpus Christi.

DEATHS

William L. Chenault, 71, pioneer oil operator of Wichita Falls, Tex., who was active in development of the Burkburnett field, died July 30.

Donald J. Hanna, 53, vice president and director of Bahrein Petroleum Co., Ltd., and California Texas Oil Co., Ltd., died July 26 in New York City. He formerly served as superintendent of Standard Oil Co. of California's Richmond refinery and served as vice president of California Arabian Standard Oil Co., predecessor of the present Arabian Americal Oil Co.

James W. Travers, 83, founder of H. & T. Oil Co., and active in development of Cuyama Valley in California, died at Taft, Calif., July 23.

Albert J. Leskoske, 57, Oil City, Pa., associated with Oil Well Supply Co. for 42 years, died last week.

Thomas P. Lyon, 76, former assistant treasurer of Cities Service Co., and who held various positions with Denver Gas & Electric Co. prior to his affiliation with the former company, died July 26 at Long Beach, Calif.

George J. Collins, 51, Tulsa, engaged in oil drilling activities in West Texas, and during World War II a facilities specialist with Petroleum Administration for War, died July 30.

N. T. Gilbert, 69, executive vice president and former general manager, Midstates Oil Corp., Tulsa, died July 28. He served as treasurer of Independent Petroleum Association of America for 14 years.

Burton A. Lilienborg, 49, Tulsa, chief geologist for National Associated Petroleum Co., died July 26. He had been with the company 13 years.

Clyde I. Layton, 60, founder of Layton Oil Co. and formerly with the old Tidal Oil Co., died in Independence, Kans., August 1.

TRANS

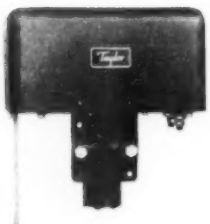
...with

Taylor's new force-balance temperature transmitter is faster, needs little maintenance, has a tiny bulb and short, shiftable range spans

HERE is a new kind of instrument that pneumatically transmits temperature as far as 1000 feet—with an extremely high degree of accuracy! Thermal element gives 63% response in less than 2 seconds (agitated water).

In addition, Speed-Act,—an entirely new technique in temperature measurement—may be added to compensate for unusual thermal lags such as occur in applications requiring separable wells.

COMPARE TRANSAIRE'S* 9 OUTSTANDING FEATURES:



1. Faster—Unprecedented speed of response.

2. Tiny, "cigarette size" bulb is more adaptable to confined space, contributes to fast speed of response. $\frac{3}{8}$" by 3" or $\frac{1}{2}$" by $3\frac{7}{16}$".

3. Short, shiftable range spans:

(a) Standard range span of 50° available where you need exceptionally close readings. Other operating range spans: 100°, 200 and 400°F.; or 25°, 50°, 100° and 200°C. Overall temperature limits from minus 375° to plus 1000°F. or minus 200°C to plus 500°C.

(b) You can shift 50° span with screwdriver from 0 to 50° to 50° to 100°, or 100° to 150°, or any intermediate 50°F. interval. Other spans similarly adjusted.

(c) Range limits interchangeable by substitution of new spring assembly, giving much greater flexibility.

4. Little or no maintenance needed. Force-balance principle practically eliminates wear. Instrument may be quickly adapted to different operating conditions by interchangeable thermal system, spring assemblies and manifold. Permits low inventory of components.

5. Eliminates all electrical hazards in explosive atmospheres.

6. Positive-acting Pilot Valve—Taylor FULSCOPE Relay Air Valve assures quick changes in transmission pressure, overcomes effect of minor leaks.

7. Fixed and Linear Output Range—3 to 15 psi output for full temperature span is linear to 0.012 psi. Fixed output pressure span *eliminates need for individual calibration of receivers or receiver-controllers.*

8. Fully Compensated for barometric and ambient temperature changes.

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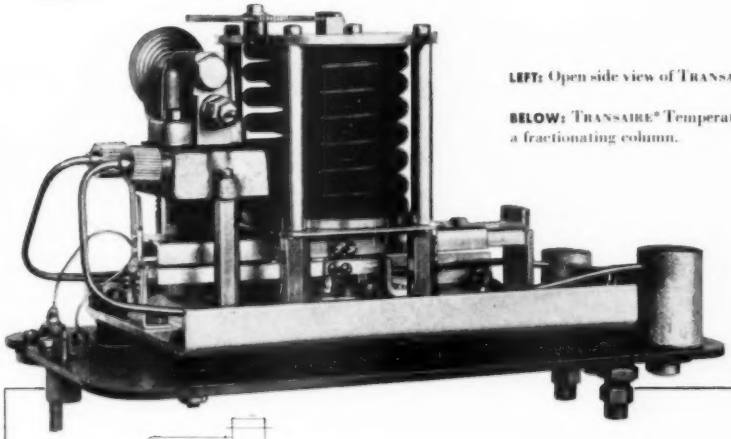
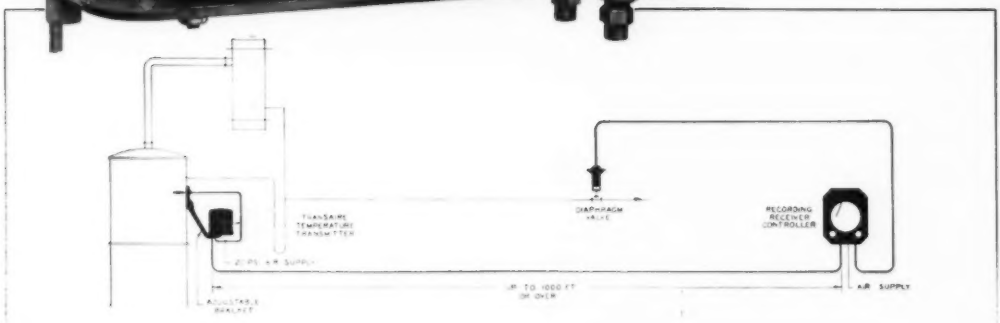


LEFT: Open side view of TRANSAIRE* Temperature Transmitter.

BELOW: TRANSAIRE* Temperature Transmitter in operation on a fractionating column.

* Trade-Mark



QUICK PICTURE OF FORCE BALANCE

TRANSAIRE* consists of *four* main assemblies:

1. A unique gas thermal system which provides force necessary to actuate transmitter.

2. A simple lever which transmits the force of the thermal system to operate the baffle—no pivots used!

3. A spring and compensating bellows assembly which balances the initial pressure in thermal system and compensates for barometric and temperature changes.

4. A balancing pneumatic circuit consisting of a bellows, baffle, nozzle and relay valve. These convert force developed by lever to precisely proportion output air pressure according to measured temperature.

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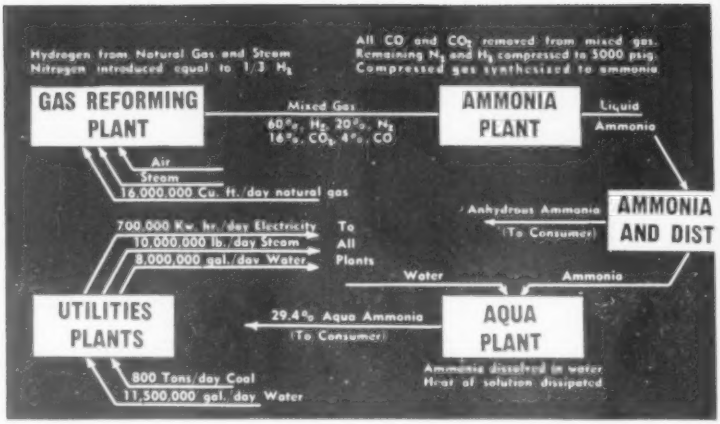
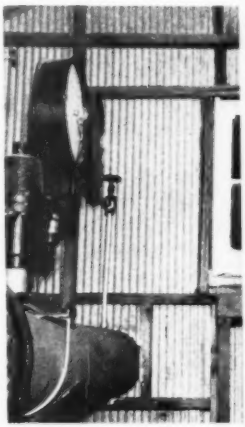


AMMONIA, AMMONIUM NITRATE, ME



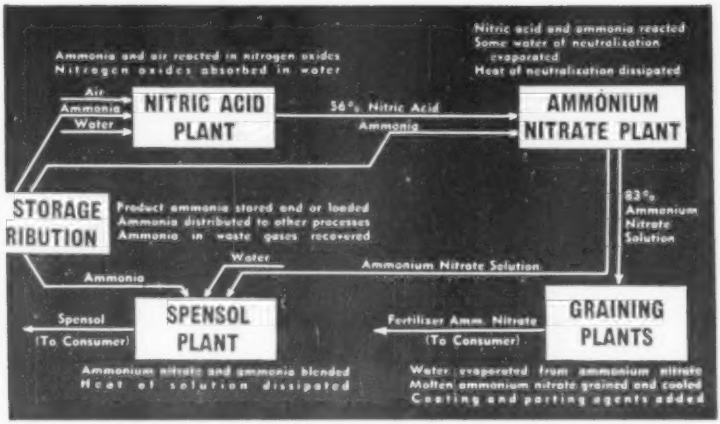
NATURAL gas takes on a new, significant role at the huge, ultra-modern petrochemical plant of Spencer Chemical Co. in southeastern Kansas. The role of the natural gas is that of the "starting ingredient" in manufacturing chemicals. As a result, in this plant natural gas is upgraded in large scale into commercial products for agricultural and industrial use.

Spencer Chemical uses only three items for its raw material—natural gas, steam, and air. From these, every day are made in large-tonnage quantities four valuable commercial materials—ammonia, ammonium nitrate, methyl alcohol, and dry ice. These four products, however, each have a further variety of ultimate or end uses. The ammonia can be used as a refrigerating gas. The ammonium nitrate is a highly effective commercial fertilizer, and also is used for many further purposes of chemical manufacturing. The methyl alcohol can be processed into formaldehyde—and that in turn into plastic resins. The dry ice is being sold in the Midwest both as a refrigerating medium and as a source of carbon dioxide for carbonated beverages.

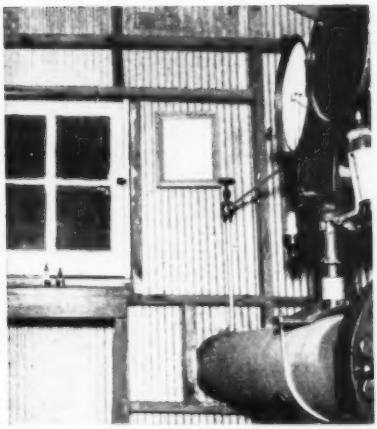
This pictorial article describes how a huge modern petrochemical plant manufactures a series of chemical products from natural gas. One of the principal products is ammonium nitrate, a valuable, concentrated, commercial fertilizer. For a short item telling how $10 worth of natural gas is processed into $140 worth of this nitrate fertilizer, sold to a Kansas farmer for $140, who then applies it to obtain an additional yield of 720 bu. of corn, bringing him $1,000 additional income—**turn to page 64.**

The chemical transformations for some of this work that Spencer does are simple, and are long-established procedures. Others, though, are complex—and involve temperatures up to 1,800° F., pressures to 5,500 psi., and catalysts of nickel, iron oxide, and platinum. These latter procedures were not commercial processes a few years ago.

Location of Spencer Chemical Co.'s plant is 22 miles south of Pittsburg,



THYL ALCOHOL, DRY ICE



ABOVE: DIAGRAM SHOWS FLOW OF MATERIALS FOR NITROGEN-FIXATION PROCESS

EXTREME LEFT: AERIAL VIEW OF SPENCER CHEMICAL CO.'S JAYHAWK WORKS

LEFT: NATURAL-GAS METERING STATION THROUGH WHICH BASIC RAW MATERIAL IS SUPPLIED TO THE JAYHAWK WORKS

by Kenneth B. Barnes
Engineering Editor

Kans., and the area used by the manufacturing and auxiliary building and equipment covers 168 acres. Seeing it for the first time, the mass view presented is something like 10 or 12 very large natural-gasoline plants set down side by side, or perhaps three or four refineries built together as a group.

Natural gas for this petrochemical manufacture is purchased from Cities Service's gas pipe lines, which originate in the gas fields of Texas, Oklahoma, and Kansas. In the past Spencer Chemical has used natural gas at rates ranging between 16 and 37 million cubic feet per day (in the plant-expansion program now under way and to be completed by early 1950, this range will increase to 20-45 million cubic feet per day).

In this operation, which is known as Spencer's Jayhawk, Kans., plant (basically the plant might be termed a "nitrogen fixation" plant) there is, incidentally, a great deal of electric power required. Spencer Chemical would prefer also to use natural gas for this purpose, and sometimes does when pipe-line loads permit. Otherwise, 900 to 1,150 tons per day of southeastern Kansas powdered coal are consumed for power and process steam generation.

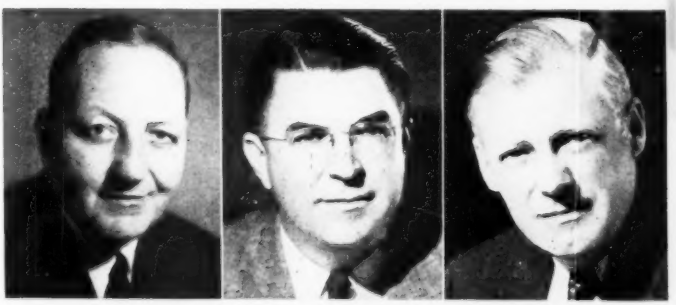
Processing Gas to Chemicals, Fertilizers

The processing steps that the company uses in turning natural gas, air, and steam into commercial products, including NH_3, NH_4NO_3, CH_3OH, and solid CO_2, divide into five principal manufacturing operations. The chemical reactions, gas and liquid handling, and process equipment involved in these operations can be described briefly as follows:

1. Gas reforming plant.—Here natural gas and steam are reacted over a nickel catalyst at high temperature to form hydrogen, carbon dioxide, and carbon monoxide. The operation is accomplished in two vessels. Between the vessels, a stream of air is injected to burn in the combustible gas (a unique reversal of the usual burning process), thus introducing nitrogen to the extent of one-third of the hydrogen. This is the necessary ratio to produce ammonia. The mixed gases with steam pass over an iron oxide catalyst, converting most of the CO to CO_2 and producing additional H_2.

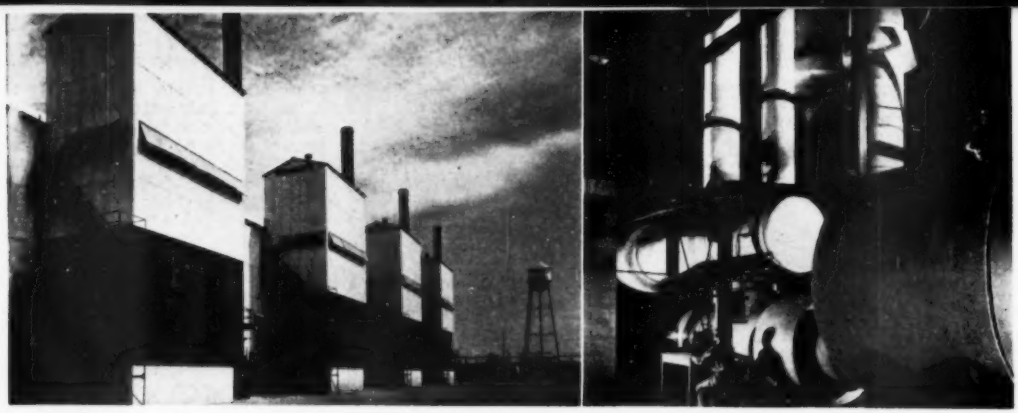
After cooling, the gases flow to the ammonia plant through two 200,000-cu.-ft. gas holders. When the plant is operating at capacity, these vessels hold at most a few minutes' supply of gas, and actually float on the lines as surge vessels.

2. Ammonia plant.—In this step the mixed gases are compressed to 250

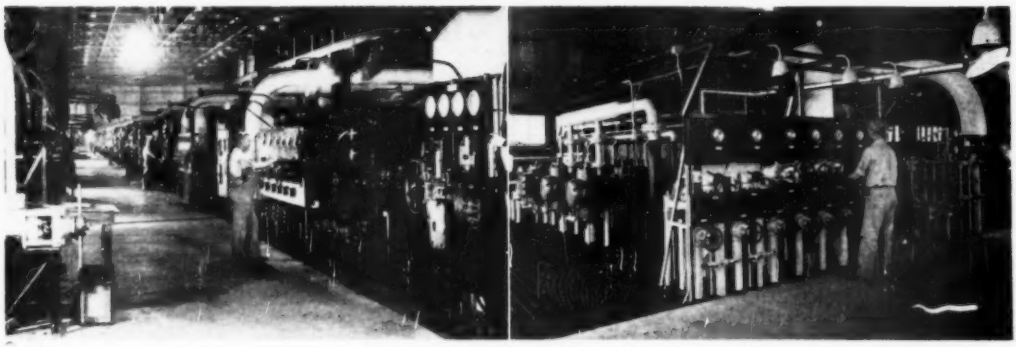


K. A. SPENCER *C. Y. THOMAS* *L. H. ALBUS*

Kenneth A. Spencer, Kansas City, is president of Spencer Chemical Co. and was the president of the predecessor, Military Chemical Works, Inc., prime contractor and operator of the original plant during the war period. He has a distinguished background as geologist, engineer, mining expert, and chemical manufacturing executive. C. Y. Thomas, Pittsburg, is Spencer Chemical vice president in charge of operations, and general manager. He formerly was chief engineer for Pittsburg & Midway Coal Co.; he is president of the Kansas Society of Professional Engineers. L. H. Albus, Pittsburg, is works manager for the entire Spencer Chemical Jayhawks Works operation



LEFT: FOUR GAS-FIRED FURNACES USED IN REFORMING NATURAL GAS WITH STEAM. RIGHT: HEAT INTERCHANGERS USED IN GAS-REFORMING PROCESS



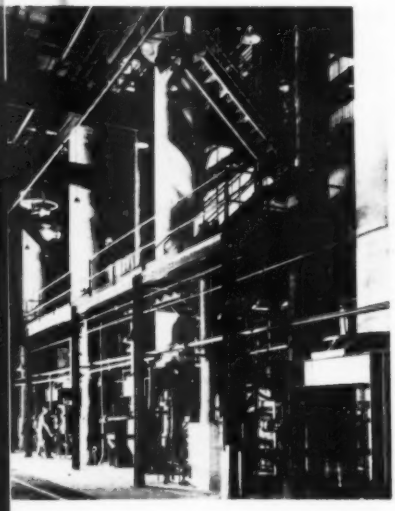
LEFT: OPERATING PANELS OF NINE STEAM-DRIVEN, SIX-STAGE GAS COMPRESSORS. RIGHT: ONE OF THE SIX-STAGE COMPRESSORS WHICH BOOSTS H_2-N_2 GAS TO ABOVE 5,000 PSIG.

psig., after which scrubbing with water removes most of the CO_2 present. This is done in packed towers 8 ft. in diameter by 80 ft. high. The gas is then compressed to 1,800 psig. where it is scrubbed with cuprous ammonium formate to remove CO, and with aqua ammonia to remove last traces of CO_2. Purification of the synthesis gas is so complete that after these steps it contains no more than 20 p.p.m. of all impurities combined.

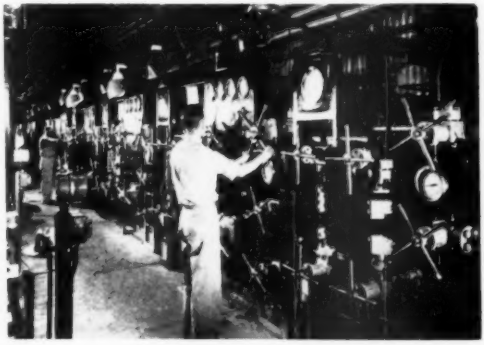
The purified gas is compressed to 5,000 psig. at which pressure it occupies only 1/340 of its volume on entering the plant. The gas passes into the synthesis equipment setup where, as it recycles, a portion is converted to ammonia on each pass. The ammonia is condensed and removed. It is interesting to note that the mixed gases which flowed to the ammonia plant in two 42-in. lines, leave the section as ammonia in two 3-in. lines flowing to storage.

3. Nitric acid plant.—In this step the ammonia is burned in air over a platinum gauze catalyst to form nitrogen oxides. The nitrogen oxides are absorbed in water in a pressure system, to form nitric acid.

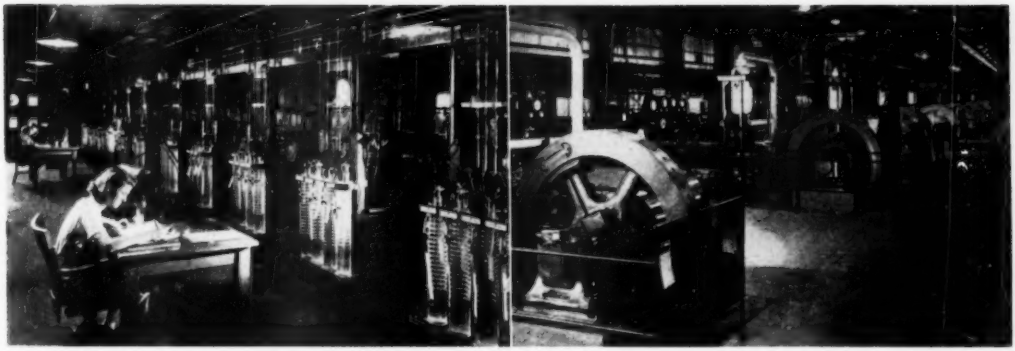
It is interesting to note that the solution of three units of soluble gas



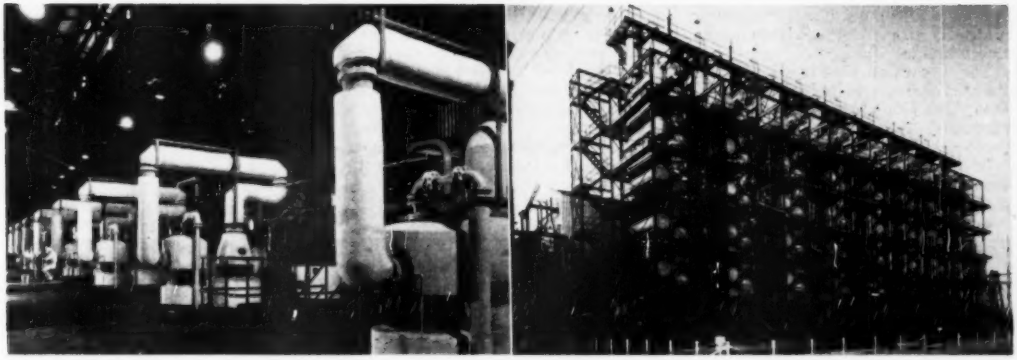
RIGHT: HIGH-PRESSURE PURIFICATION, CONTROLLING FINAL REMOVAL OF CO AND CO_2



LEFT: HIGH-PRESSURE CONVERTERS IN WHICH AMMONIA IS SYNTHESIZED



LEFT: AMMONIA PLANT LABORATORY—CONTINUOUS GAS-ANALYZING EQUIPMENT. RIGHT: GAS CIRCULATORS USED IN RECYCLING HIGH-PRESSURE SYNTHESIS GAS



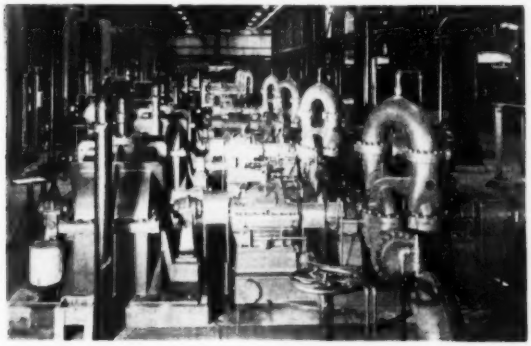
LEFT: MIXER-FILTERS AND BURNERS IN THE NITRIC ACID PLANT. RIGHT: ABSORPTION DRUMS WHERE OXIDES OF NITROGEN ARE ABSORBED IN CONDENSATE TO PRODUCE NITRIC ACID

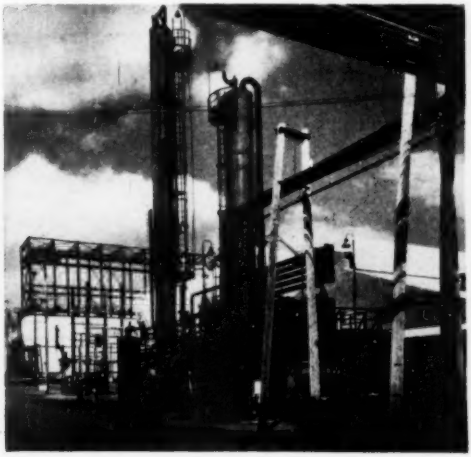
in water produces one unit of insoluble gas which must be oxidized, after which it dissolves, forming one-third unit of insoluble gas and so on, ad infinitum. Because of the corrosive nature of the product, stainless steel is used for vessels and lines throughout this plant section, as well as in the ammonium nitrate plant.

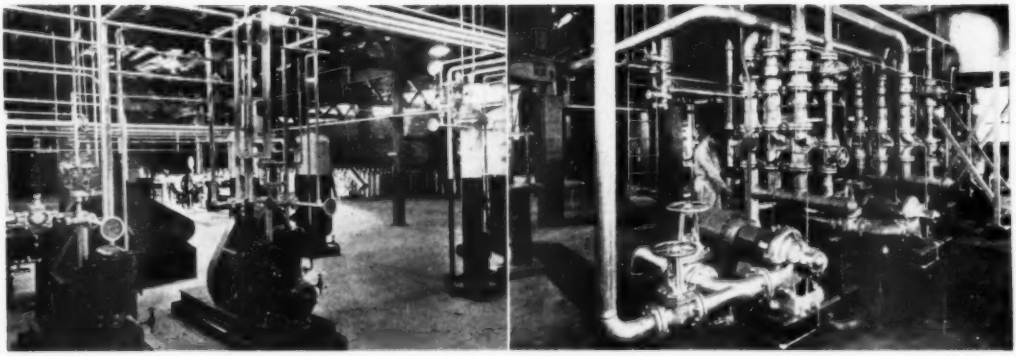
4. Ammonium nitrate plant.—The feed of ammonia and nitric acid react, while circulating, to form ammonium nitrate solution. The heat formed in the reaction is used to evaporate the water content and concentrate the solution. It is only in this section of the Spencer plant that the product formed can be seen. Elsewhere the materials move within the equipment without visual evidence of its passage.

5. Graining plant (located at Parsons, Kans.).—Transported via special railroad tank cars to this plant, ammonium nitrate solution is heated to

RIGHT: METHANOL DISTILLATION COLUMNS. BELOW: WATER PUMPS USED IN CO$_2$ REMOVAL PROCESS







LEFT: BOTTLING PLANT WHERE HIGH-PURITY AMMONIA IS PACKAGED FOR REFRIGERATION USE. RIGHT: CIRCULATION PUMPS AND PIPING USED IN MANUFACTURING HIGH N_2 SPENSOL SOLUTIONS

eliminate all water. Then the molten nitrate is grained by agitation in kettles while cooling.

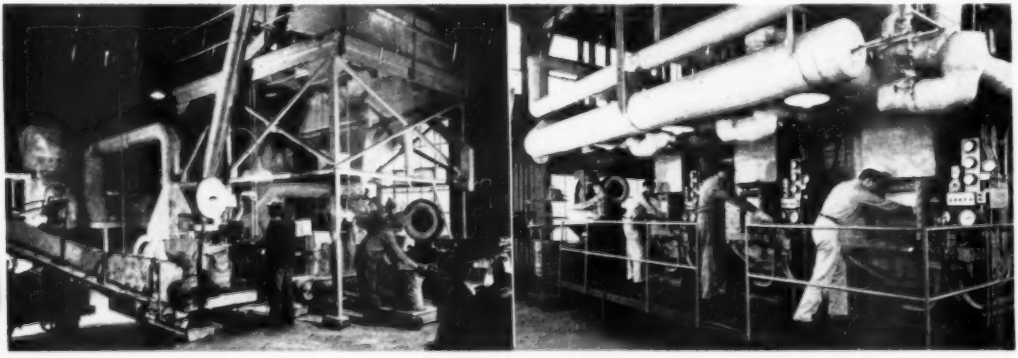
The resultant high-nitrogen fertilizer is coated and parted with suitable anticaking conditioners. It is automatically packed in moisture-proof 100-lb. paper bags for shipment.

In the contemplated new fertilizer ammonium nitrate process plant and storage warehouse, fertilizer ammonium nitrate will be prepared and packaged in a newly developed and highly satisfactory spherical pellet form, at a rate of 250 tons per day. The finished product has been tailored to the consumer's need for a product which is easy to handle and apply and which can be stored for indefinite periods without affecting these properties.

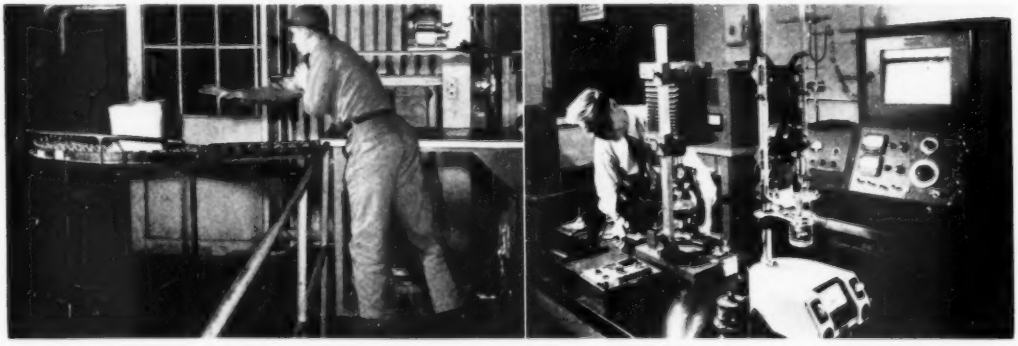
In the Spensol plant, high-concentrate nitrogen solutions are prepared in a form favored by the fertilizer-mixing companies for convenient addition of nitrogen food to mixed fertilizers. In addition to the high-concentrate plant food element which the solution carries, it has the additional desirable property of neutralizing excess acid in fertilizer mixtures.

A high grade of anhydrous am-

(Continued on page 64)



LEFT: BAGGING GRAINED AMMONIUM NITRATE. RIGHT: HYDRAULIC PRESSES WHICH FORM DRY ICE



LEFT: PACKAGED DRY ICE EN ROUTE TO INSULATED SEMITRAILERS. RIGHT: EQUIPMENT USED IN RESEARCH AND DEVELOPMENT PROJECT WORK

Colorado's First Catalytic Cracker . . . Conoco's fourth T.C.C. unit

completes 8 months of operation—Enlarged refinery can now process 7,500 bbl. per day of crude oil

by J. E. Fenex.* A. W. Hoge,† and Lee Friedman†

CONTINENTAL OIL CO.'s fourth T.C.C. unit, one of the latest of the small-scale moving-bed catalytic cracking units, went on stream a little more than 8 months ago. The new unit, located just outside of Denver's city limits and 60 miles east of the Continental Divide, establishes the first catalytic operations in Colorado.

With the completion of its expansion program at the Denver refinery, Continental has more than doubled crude-processing capacity of the plant.

The original refinery at Denver consisted of a 3,500-bbl.-daily topping unit, a conventional two-coil thermal cracking unit, and a small liquefied petroleum gas plant. The enlarged refinery can now process approximately 7,500 bbl. per day of crude oil and yields improved quality products. The expansion also includes a new vapor-recovery and gasoline-stabilization unit, catalytic polymerization and enlarged L.P.G. facilities. In addition the existing 1,500-bbl.-per-day thermal unit has been revised to thermally reform virgin naphtha and to process T.C.C.-unit tar and cycle stocks instead of straightrun gas oils.

The crude oil processed in the Denver plant is delivered through Rocky Mountain Pipeline Co., a Continental Oil Co. subsidiary, from the various crude-oil producing fields in Wyoming and Colorado. Among them are the Lance Creek and Horse Creek areas of Wyoming and Rangely field in Colorado. Refinery products are in turn distributed throughout the Rocky Mountain area, where Continental is active as one of the chief producers, manufacturers, and marketers of petroleum products.

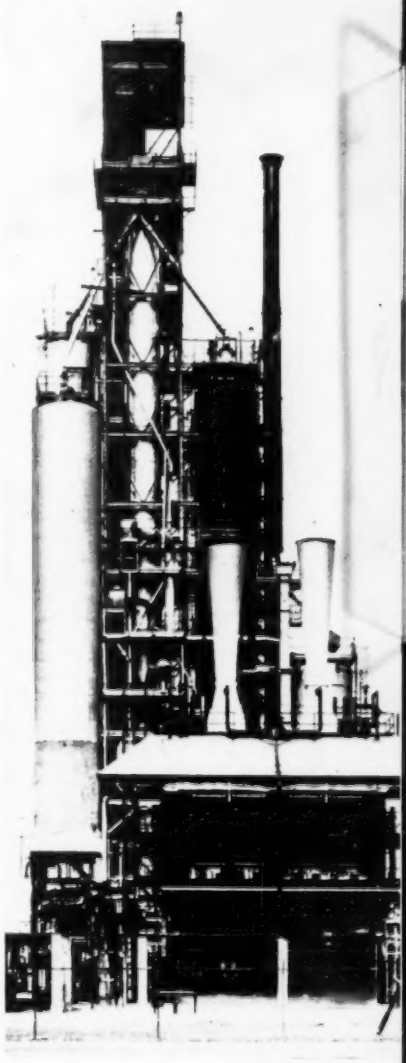
The Rocky Mountain area refinery marketing situation is characterized by weak heavy fuel oil demand and the need for a maximum gasoline yield. Thermofor catalytic cracking, with the highest designed internal recycle ratio to date for such units, was selected as the optimum means of obtaining the desired refinery-product distribution. After a 15-day demonstration run at the turn of the year, the T.C.C. unit having exceeded its guaranteed performance was accepted by Continental. It has since continued to play a part in maintaining the optimum economic refinery-product balance.

*Continental Oil Co., Denver. †Houdry Process Corp., Philadelphia.

Process Description

On initial startup the expanded refinery processed approximately 7,500 bbl. per day of a blend of Lance Creek and Horse Creek, Wyoming, low-sulfur crude oils. Shortly thereafter, sour Rangely crude oil from Colorado was brought in the refinery and made up most of the charge to the crude unit. True-boiling-point evaluation of the three crude oils is summarized in Table 1. Lance Creek crude oil is the very highly paraffinic material; the reduced crude has an aniline point of approximately 204° F. and is the stock upon which T.C.C. performance guarantees were based. Table 1 indicates that the F-2 clear octane number of the 300°-e.p. gasoline is 54 while the F-2 rating of the 300°-410° F. gasoline fraction calculates 10. The approximately equivalent fractions of the Horse Creek crude oil have octane values of 72.0 and 44.5, indicating a much lower paraffinicity of this stock. The moderately sour Rangely crude oil (0.87 weight per cent sulfur) is intermediate in paraffinicity between the two Wyoming crude oils.

An unusual processing feature in



The new small-scale moving-bed catalytic cracking unit

TABLE 1—T.B.P. EVALUATIONS, DENVER REFINERY CRUDE OILS

	Horse Creek crude oil		Lance Creek crude oil		Rangely crude oil	
Crude data:						
Gravity, °A.P.I. at 60° F.	34.6		42.4		34.6	
Viscosity, CS at 100° F.	9.21		3.09		5.77	
Pour point, °F.	+60		+4.5		—10	
Color	Red-Brown		Dark Green		Green-Brown	
R.v.p.			4.1		4.4	
Sulfur, wt. %	0.24		0.26		0.87	
Rams. carbon residue, wt. %	1.41		0.83		2.38	
NaCl, gm/bbl.	16		0.5		0.0	
Crude break-up, % on crude:						
% C_5 and lighter	2.5				1.46	
Gasoline fractions, °F.	IBP-290	290-391	IBP-300	300-410	IBP-272	272-395
% on crude	14	10	29	15	14	11
°A.P.I.	68.8	47.5	65.1	48.4	70.0	50.6
Sulfur, wt. %	.006	.009	.005	.022	.003	.023
F_2 octane, clear	72.0	44.5	54	10	61	35
Distillate cut, °F	391-596		410-579		395-604	
% on crude	24		21		28	
°A.P.I.	37.1		39.7		35.7	
Viscosity, SSU at 100° F.	36.3		37		35.7	
Sulfur, wt. %	0.15		0.033		0.53	
Cold test	—5		+7		—25	
Heavier fractions	Resid.		Gas Oil	Resid.	Resid.	
% on crude	46.0		15.0	20.0	44.0	
°A.P.I.	23.6		33.6	23.5	21.0	
Sulfur, wt. %	0.47		24		1.42	
Vis., SSU (G.O.) at 100° F. (Resid.) at 210° F.	81.6		68	110	77	
Carbon residue, wt. %	3.14					

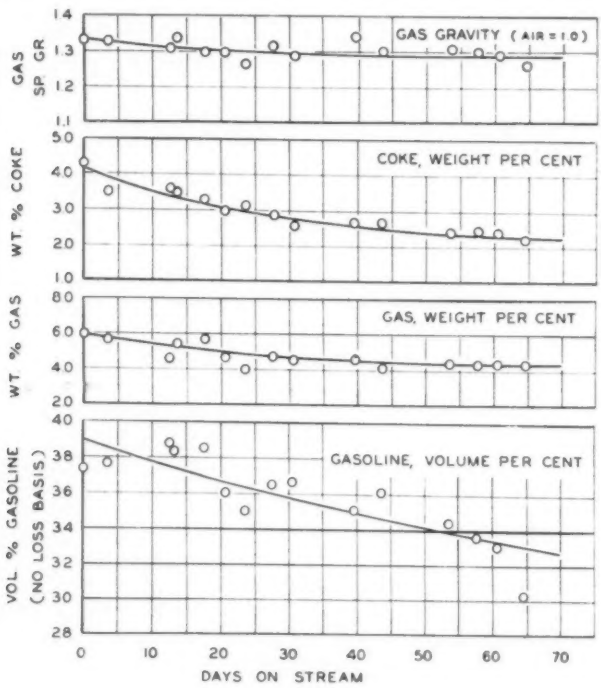
the refinery is the recycle ratio of the T.C.C. unit reactor. In order to obtain the maximum gasoline yield and a minimum-fuel oil production, the reactor has been designed to operate at a recycle ratio of 1:1 on a fresh reactor charge of 3,300 bbl. per day. For a short time the operation approached total recycle when both of the catalytic gas oil streams, light catalytic gas oil, and the heavier recycle stock were returned to the reactor.

Refinery crude-oil charge is processed in a conventional manner in the crude-distillation unit. Approximately 30 per cent of the 365° F.-e.p. straightrun gasoline and lesser quantities of the distillate fuels are removed from the crude, leaving approximately 49 per cent reduced crude as charge to the catalytic cracking unit. Topped crude varied in gravity from 24° to 27° A.P.I. depending on the quantity of diesel oil withdrawn from the crude tower. The T.C.C. charge stock has never included material in the gasoline boiling range.

A vacuum assay of T.C.C. reduced crude charge when the refinery charge consisted of a blend of 85 per cent Lance Creek and 15 per cent Horse Creek oil was as follows:

	Corrected to 760 mm pressure
I.b.p.	545° F.
10 per cent	635
20 per cent	662
30 per cent	708
40 per cent	756
50 per cent	807
60 per cent	863
70 per cent	930
80 per cent	962
87 per cent	980
°A.P.I.	26.6
Carbon residue, weight per cent	2.64

The topped crude is charged directly to the T.C.C. heater at a temperature of 545° F. from the bottom of the secondary crude-distillation tower. Heater effluent at approximately 855° F. flows to a tar separator where, under the condition of the demonstration run, 12 per cent of the 51 per cent reduced crude was removed as tar. Remainder of the fresh charge is taken overhead in the tar separator as virgin reactor charge. The relatively large quantity of recycle catalytic gas oil decreases to some extent the quantity of steam required to aid in the vaporization of the fresh charge in the tar separator. Vaporization steam is added to the oil in the final rows of tubes in the heater, superheating the steam to the same temperature as that of the oil. A small quantity of low-pressure steam is in-



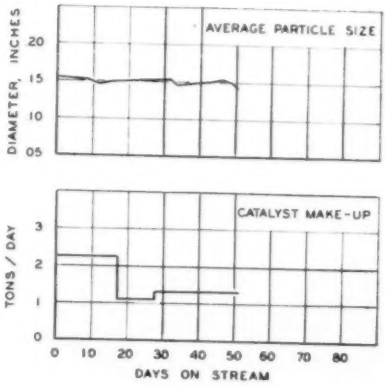


Fig. 1—(Left) Cat-A catalyst activity vs. days on stream. (Filtrol T.C.C. clay catalyst)
Fig. 2—(Below) Catalyst size and makeup vs. days on stream

troduced into the top of the tar separator to prevent hydrocarbon condensation in the overhead line to the reactor.

Effluent from the reactor at about 875° F. is fractionated in the synthetic crude tower to produce a wet-gas stream, light and heavy gasoline, light catalytic gas oil, and intermediate catalytic gas oil for internal recycling and heavy catalytic gas oil (synthetic tower bottoms). The T.C.C. wet gas is compressed to 200 psig., contacted with a light gasoline with the combined streams entering the bottom of the gas-plant absorber.

Absorber operation permits the C_2's and lighter to pass overhead as fuel gas and delivers a C_3+ bottoms stream to the stabilizer for production of debutanized 400° F.-e.p. gasoline. Stabilizer overhead is totally condensed and charged directly to a Girbotol treater for sweetening. Girbotol effluent flows directly to the catalytic polymerization unit for further gasoline production.

The light and heavy catalytic gas-oil product, along with tar separator bottoms, are charged directly to the thermal unit and heavy-gas-oil tower for thermal cracking and vis-breaking. The thermal unit recycles light gas oil to extinction, increasing the refinery gasoline yield and completely eliminating cracked distillate production.

Catalytic polymerization reactor effluent is fractionated in the L.P.G. plant through a deethanizer, depropanizer, and debutanizer, in that order. Propane and butane are taken overhead of their respective columns, dried through flake caustic, and flow to L.P.G. storage. The deethanizer overhead, along with the T.C.C. absorber overhead, supplies the refinery fuel-gas system.

TABLE 4—STREAM INSPECTIONS, POD ANALYSIS

	Absorber O.H. mol. %	Debutanizer O.H. mol. %	Debutanized gasoline liq. vol. %
H_2*	36.6	...	...
C_1	40.4	...	...
$C_2^=$	5.4	1.1	...
C_2	11.7	3.0	...
$C_3^=$	3.0	20.3	...
C_3	1.4	12.7	...
$C_4^=$	...	26.1	...
iC_4	0.3	27.3	0.09
nC_4	...	8.0	...
C_5+	1.2	1.5	99.91
	100.0	100.0	100.00

*Hydrogen content assumed to be 47.5 per cent of C_1 fraction.

TABLE 5—TOTAL CATALYTIC GASOLINE PRODUCTION

	T.C.C. effluent		Cat. poly. feed		Cat. poly effluent		Total cat. gasoline		% of T.C.C. virgin reactor charge	
	B/D	lb./hr.	B/D	lb./hr.	B/D	lb./hr.	B/D	lb./hr.	Vol. %	Wt. %
C_1's		750		6		6				
C_2's		786		282		189				
C_3's	334	2,487	305	2,274	119	899				
C_4's	576	4,890	567	4,772	356	2,990				
C_5+ gasoline	2,152	23,233			307	3,250	2,459	26,483	73.4	62.5
Light cat. gas oil	415	5,745								
Hvy. cat. gas oil	134	1,924								

TABLE 2—TEST RUN YIELD SUMMARY AND OPERATING CONDITIONS
(Test period: Dec. 26, 1948, to Jan. 10, 1949)

	Guarantee	—Avg. during 15-day test run—			
	B/D	B/D	Lb./hr.	Vol. %	Wt. %
Charge:					
Reduced crude		3,790	48,648		
Recycle gas oil	3,300 Min.	3,814	48,840		
Total charge to tar separator		7,604	97,488		
Tar product		456	6,359		
Total reactor charge		7,148	91,129		
Virgin reactor charge	3,300 Max.	3,334	42,289	100.0	100.0
Products:					
C_1 and lighter			750		1.8
C_2's			786		1.9
C_3's		334	2,487	10.0	5.9
C_4's	433 Min.	576	4,890	17.2	11.6
Debutanized gasoline	1,981 Min.	2,152	23,233	64.4	54.8
Light cat. gas oil		451	5,745	13.5	13.6
Syn. tower bottoms		134	1,924	4.0	4.5
Liquid recovery, C_5+	3,121 Min.	3,313		99.1	
Carbon (on catalyst analysis)			2,860		6.8
Gain			+386		+0.9
Conversion, volume %					82.5
Cracking efficiency, volume %					78.2
Operating conditions:					
Space rate: Total feed					1.29
Space rate: Fresh feed					0.59
Space rate: Recycle					0.70
Catalyst/oil ratio, T.F.					2.00
Oil to reactor, °F.					843
Catalyst to reactor, °F.					984
Average catalyst temperature in reactor, F.					876
Steam, weight % total feed					3.64
Reactor top pressure, psig.					7.7
Catalyst circulation, T/hr.					76
Carbon on spent catalyst, weight %					2.10
Carbon on reg. catalyst, weight %					0.22
Kiln steam prod., lb. per hour					23,880

TABLE 3—STREAM INSPECTIONS, A.S.T.M. DISTILLATIONS

	Reduced crude	Recycle gas oil	Furnace charge*	Tar	TSO	Light gasoline	Heavy gasoline	Debut. gasoline	Lt. cat. gas oil	Syn. Tr bottoms
°A.P.I.	29.4	29.5	28.8	16.4	30.5	60.6	36.0	59.4	30.1	11.9
R.v.p.						7.3		5.2		
A.S.T.M., °F.:										
I.b.p.	505	420	440		440	101	246	107	412	521
10%		520			536	140	341	130	440	619
20%		530			547	165	349	143	448	662
50%		560			594	221	370	209	462	
90%		650				310	411	354	494	
E.p.		700			700	364	444	410	536	700
Rec., %		98			85	98	99	99	99	36
Clear Oct. No.:										
F-2								†77.8		
F-1								87.8		

*Approximately 525 bbl. per day of tar recycled to heater. †F-2 octane number for 10 lb. R.v.p. T.C.C. gasoline = 78.7. Guaranteed F-2 octane number for 10 lb. R.v.p. T.C.C. gasoline = 78.0.

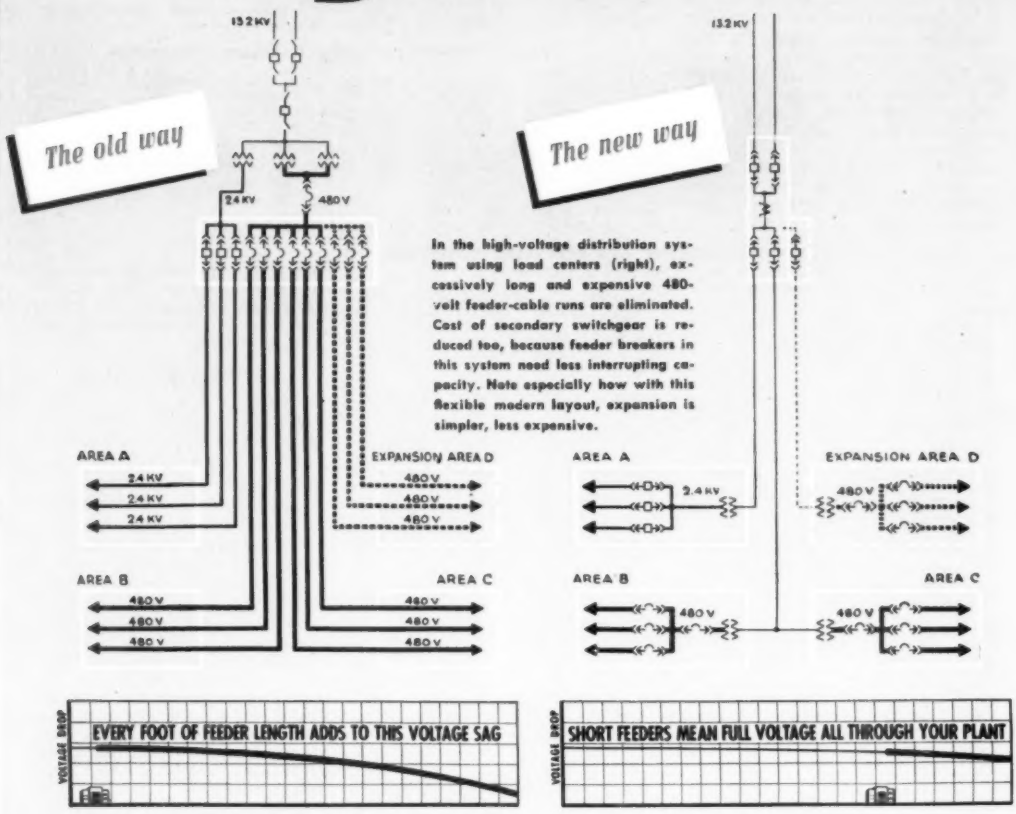
Mechanical Features

Perhaps the most outstanding feature of Continental's Denver refinery is the tightly integrated nature of the plant operations. Charge to each unit is received directly from the preceding section of the refinery without any intermediate storage. Except for some gas-oil storage for thermal-unit charge, no intermediate surge capacity has been provided within the refinery. As an example, the T.C.C. heater was designed to receive hot reduced crude directly from the bottom of the secondary crude tower. Another simplifying feature of the refinery is the use of the common control room for all the process units. The existing control room was revamped to include the control instrumentation for the new and enlarged refinery units.

Charge material to the T.C.C. unit is processed through the conventional arrangement of heater, tar separator, reactor-kiln section, and distillation section. The unit includes a single split-bucket-type elevator for circulation of both the spent and regenerated clay catalyst. In addition, the elevator mechanism, including the cylindrical housing, is suspended from the top of the T.C.C. structure. The unit itself has a very compact arrangement, the kiln, reactor, synthetic crude tower, stripper tower and tar separator are in the same vertical plane and all can be reached from the same common level on the structure. The unit, as well as the rest of the refinery, has a striking appearance because of the bright aluminum

What's the trend in refinery electrification?

more high-


The old way
The new way
132 KV
24 KV
480 V
AREA A
EXPANSION AREA D
AREA B
AREA C
2.4 KV
480 V
In the high-voltage distribution system using load centers (right), excessively long and expensive 480-volt feeder-cable runs are eliminated. Cost of secondary switchgear is reduced too, because feeder breakers in this system need less interrupting capacity. Note especially how with this flexible modern layout, expansion is simpler, less expensive.
VOLTAGE DROP
EVERY FOOT OF FEEDER LENGTH ADDS TO THIS VOLTAGE SAG
SHORT FEEDERS MEAN FULL VOLTAGE ALL THROUGH YOUR PLANT

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WHEN YOU COME TO GENERAL ELECTRIC you get far more than the finest in electrical equipment. A General Electric application engineer, familiar with refinery practices, is at your disposal. If desired, he stands ready to take over the job of co-ordinating all the needed components, engineering your power distribution into one modern, efficient system.

voltage distribution

to reduce power losses, cut equipment costs

You see it in more and more refineries today. It's the trend to load-center power distribution. High-voltage power is distributed within the plant right to the heart of electrical load areas. There it's stepped down to utilization levels in load-center unit substations and carried to points of use by *short* low-voltage secondary feeders.

This modern method provides several advantages. By replacing long, low-voltage feeders with short ones, voltage fluctuation is kept within narrow limits, and voltage drop is lessened. This cuts power losses, permits plant equipment to run at full efficiency.

Economies in the cost of cable runs, as well as in the cost of transformers and secondary switchgear, go hand in hand with high-voltage distribution. Plant rearrangements or additions can be made at less cost because of the flexibility of this system. Lower maintenance costs and easier installation are added advantages.

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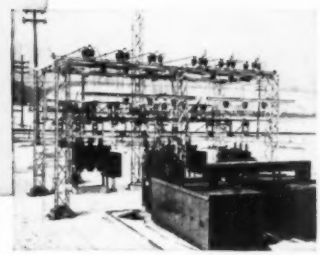
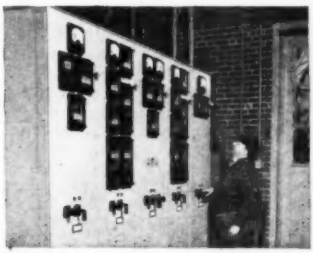


These completely metal-enclosed G-E package substations are factory-built to fully co-ordinated designs. You save both engineering time and installation time.



In G-E metal-clad switchgear, convenient vertical-lift construction of magne-blast air circuit breakers makes it a quick, easy job to remove them for inspection or maintenance.

Lead-center unit substations—compact, fully enclosed, and built from matched components—are complete, easy-to-specify units. Made in flexible combinations, easy to rearrange.

GENERAL ELECTRIC

sheet used to wrap the insulation on both the vessels and the lines.

The T.C.C. plant was originally designed to process sweet stocks only and, except for some alloy steel required by temperature limitations in the kiln, carbon steel was specified throughout the unit. On the same basis, no catalyst prehydration facilities were required to protect the natural-clay catalyst from sulfur poisoning. However, while the plant was under construction, the refinery charge-stock picture changed to include the moderately sour crude oil (0.87 weight per cent sulfur) from Rangely field. For corrosion protection against the high-sulfur stocks, alloy liners were added in critical locations. Chrome (11-13 per cent) steel liners were installed in the tar separator and the bottom section of the synthetic crude tower; an 18-8 chrome-nickel alloy lining was added to the reactor.

Introduction of sour stocks also made it desirable to install steam hydration facilities to alleviate abnormal aging of the catalyst. Steam-distribution spiders were added to the reactor hopper and the bottom of the kiln just above the first drawoff tray. Effectiveness of the hydration steam is indicated by the normal aging of the catalyst even when processing sour stocks. The reactor was switched from flue-gas seal to steam seal just prior to the introduction of the Rangely crude oil to the refinery. The initial hydration conditions were as follows:

Hydration steam to	
(a) bottom of kiln	1,974 lb./hr.
(b) reactor hopper	2,566 lb./hr.
Total	4,540 lb./hr.
Steam to reactor seal	588 lb./hr.
Reactor seal differential	10 in. of water
Reactor catalyst circulation	74 tons/hr.
Reactor top pressure	6.1 psig.

The changeover occurred without incident and the unit has continued to operate very smoothly.

A mechanical feature of interest in the refinery is the compressor installation in the gas plant. Wet gas from the T.C.C. unit, as well as straightrun and thermal-unit stabilizer gases, are compressed through a 1,000-hp., two-stage reciprocating compressor driven by a 3,600-r.p.m. steam turbine through reduction gears. There are two such units, each of which is designed to handle the total charge to the gas plant. The turbine drive was installed with the possible future replacement by an electric motor drive in mind.

Test-Run Summary

Performance of the new catalytic cracking unit was thoroughly evaluated in the 15-day demonstration run. Charge to the unit during this period consisted of Lance Creek reduced crude with a small percentage of Horse Creek reduced crude. The yields and operating conditions during the test period are summarized in Table 2. Typical stream inspections during this same period are indicated in Table 3 (A.S.T.M. Distillations and Octane Values) on Table 4 (Pod Analysis). It will be noted that the recycle ratio of 1:1 to 1 has raised debutanized gasoline production to a very high level despite the paraffinicity of the charge stock. The 64.4 volume per cent yield of debutanized gasoline based on fresh feed and its 10-lb. R.v.p. F-2 clear octane number of 78.7 are both in excess of the guaranteed performance. T.C.C. gasoline production increased to approximately 2,306 bbl. per day upon blending with L.P.G. butane to 10 lb. R.v.p. It will also be observed that a C_5+ liquid recovery of 99.1 volume per cent was obtained even at this high conversion level of 82.5 volume per cent. The increase in refinery-gasoline production through catalytic polymerization of the C_3 and C_4 unsaturates in the reactor effluent is summarized in Table 5. These data indicate that catalytic polymerization increased in the C_5+ gasoline production to 73.4 volume per cent of the virgin reactor charge.

The over-all product yields for both catalytic cracking and catalytic polymerization are as follows:

OVER-ALL PRODUCT YIELDS

	B.D.	Lb./hr.	% of virgin feed to T.C.C. reactor: Vol. %	Wt. %
C_1's		750		1.8
C_2's		786		1.9
C_3's	129	963	3.9	2.3
Excess C_4's	165	1,385	4.9	3.3
10 lb. R.v.p. gasoline	2,650	28,000	79.3	66.1
Light cycle stock	451	5,474	13.5	13.6
Heavy cycle stock	134	1,924	4.0	4.6
Carbon		2,860		6.8
				100.4

C_5+ liquid recovery = 101.7 vol. per cent of T.C.C. virgin feed.

Catalyst Performance

The T.C.C. unit used Filtrol clay catalyst with a normal inventory in the system of approximately 268 tons. The two hot-catalyst storage bins of combined capacity of 278 tons make it possible to empty the circulating catalyst system completely. The Cat-A activity of the initial catalyst charge was approximately 39 and after 60 days on stream had decreased in a normal manner to an activity of approximately 33. Fig. 1 is the catalyst aging record for the first 2 months of operation of the new unit. Fig. 2 indicates catalyst usage and the average particle size of the circulating catalyst over the same period. The average particle size of 0.15 in. indicates efficient elutriation and a minimum of catalyst attrition. During the test period, the carbon content of the spent catalyst remained fairly constant at 2.10 weight per cent while that of the regenerated catalyst was 0.22 weight per cent. The carbon burnoff, based on catalyst analysis, was 2,860 lb. per hour when the kiln 175-psi. steam production averaged 23,880 lb. per hour.

Gasoline-Finishing Treatments

Treating the catalytically cracked gasoline for the production of the doctor-sweet, stable, and noncorrosive fuel has proved to be a very simple matter. A single-stage treat with strong batch caustic and the use of the proper inhibitor are the only additional refining steps necessary to produce specification gasoline. Such was the case even when the sour Rangely crude oil made up a major portion of the refinery charge.

The original refinery design provided a commercial sweetening unit for the production of a doctor-sweet gasoline. The use of strong caustic (30-35 weight per cent NaOH) in a 50-50 volumetric mix with the gasoline has obviated the necessity of using the sweetening unit. The T.C.C. gasoline thus treated was usually slightly sour to the doctor test on leaving the caustic wash drum but became doctor sweet in storage in a very short time.

BOOKS

ELEMENTS OF MECHANICAL VIBRATION. By C. R. Freberg and Emory N. Kemler. Second edition. Published by John Wiley & Sons, Inc., 440 Fourth Avenue, New York. 227 pp. $3.75.

The second edition is distinguished by the addition of two new and important chapters—Sound and Beams. The increased emphasis which engineers must give to noise elimination led to the inclusion of the chapter on sound and its engineering applications. Since beams are a very common structural element, they have been given additional emphasis by combining the previous discussion with new material and presenting it as a separate chapter. The book lays stress on the simple treatment of problems from a basic analysis. It also offers to the reader an extremely wide range of practical problems, an uncomplicated mathematical notation, simplified, yet adequately detailed explanations of the more elementary phases of vibration, plus methods and formulas in use, and directions for using them.

1—Instructor John Boatman points out a feature of a diesel drilling engine unit during classwork at the course in drilling engines introduced this month in Odessa, Tex. Others, left to right, are B. L. Coughlin, Jack Wiggins, T. W. Roberson, T. J. Toft, Fred Forster, Jr., Don Beck, Eugene Seabolt, W. A. Poole, William H. Measures, James Duncan, and T. J. Gerlach, Jr. 2—Three students and Instructor Boatman look over a defective radiator section during a class in the drilling-engine training course. Others, left to right, are Eugene Seabolt, Fred Forster, Jr., and T. J. Gerlach, Jr. 3—T. W. Roberson displays a badly worn bearing during a roundtable discussion session. Looking on, left to right, are Bernard L. Coughlin, T. G. Gerlach, Jr., T. J. Toft, and J. Ed Irwin, sales manager, General Machine & Supply Co., Odessa. 4—Students observe effects of improper engine care which resulted in badly eaten out bearings during course instruction. Left to right they are W. A. Poole, William Henry Measures, James Duncan, and Instructor Boatman

Care, Maintenance of Drilling Engines Subject of Odessa College Course

ODESSA, Tex.—Care and maintenance of drilling engines, subject of the oil industry's newest course for field personnel, was introduced here recently by Odessa College in conjunction with University of Texas; American Association of Oilwell Drilling Contractors; the state board for vocational education; and engine manufacturers, distributors, and service firms.

The course, culminating years of talk and planning by A.A.O.D.C. members, is being offered in two separate classes each day to allow attendance by both night and day field workers.

John Boatman, maintenance supervisor for Rowan Drilling Co., Inc., is instructor for the 36-hour classes. He has received advice from Jack Wiggins, Texas University petroleum-training specialist, in setting up this trial course.

Preparatory work on the course was accomplished early this year by a committee on drilling-engine training of the Permian basin chapter of the A.A.O.D.C. Cecil Provine, division chief for Rowan, committee chairman, explained that this course is designed for field personnel who handle drilling engines.

"There will be no attention given to major overhauls, installation of large repair parts, or other work done in the company yard or at a service firm," Provine explained. "It is designed to teach the engine man how to start, operate, and stop his unit in the cheapest and safest way with the least risk of damage to the engine and the greatest work output on the drilling contractor's investment."

Six live engines, valued at upwards from $50,000, are being installed in the classroom which is a converted machine shop of Odessa High School. Units include a Cummins L1600 diesel, General Motors 6-71 twin diesel, Le Roi L3000 gas, Waukesha 6LRO gas, Superior PTD-6 dual fuel gas-diesel unit, and a Climax gas engine.

Each is equipped with a silencer, separate exhaust outlets, and starting mechanism. Engines will be operated

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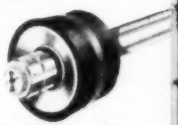

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and adjusted by the class groups of about 12 men. Laboratory work will accompany lectures, question-and-answer sessions, showing of training films, and reports from engine manufacturer representatives.

Completion of the first 3-week classes on July 28 will be followed August 8 by a "quick course" where the 36-hour class is offered in 4½ days of intensive training. This is set up for field men who live too far from Odessa to make the daily drive to school.

Boatman says safety and cleanliness are the key words in successful operation of drilling engines. He makes it clear in each class session that the best performing engine is the one with a clean fuel supply, carefully cleaned working parts, and an operator with good housecleaning habits in all phases of operation. Likewise, employment of safe practices and the use of proper tools in operation make for greater safety to the individual and longer life for the costly power unit.

Lubrication Stressed

Lubrication was stressed as one of the first important steps in engine operation. Boatman pointed out that neither smell, color, nor feel can correctly tell the right time to change oil. He suggests use of an oil-testing cabinet where a centrifuge and other apparatus are available for checking lube qualities of engine oil. Detectable are asphalts, solids like dirt and carbon, metals, and water as well as an indication of viscosity and acid content.

The instructor urges men to check oil samples carefully. "A small amount of bronze or other particles need not be alarming in a new engine since it indicates rough edges are being worn down," Boatman explains. "However, larger bits of bronze may point out defective lubrication or excessive bearing wear."

Boatman said some field men have such limited knowledge of nomenclature of units they operate that it is difficult to discuss operation and minor repair practices.

Four points stressed on lubrication are its comparison to the human blood stream so vital to life, the need for effective filtration before repeated use, maintenance of proper viscosity for engine needs, and cleanliness of lube oils prior to use.

Of prime importance to the safe and economical operation of the field engine is careful procedure in starting and stopping. Boatman has students check water, oil, and fuel levels; air supply if any; fan-belt tension; engine-clutch adjustment; and air filters. Idling the engine before loading allows it to attain proper operating temperature and reduces strain and wear. It is also desirable to idle the engine before cutting it off after heavy work, to allow normal cooling processes to reduce temperatures which might otherwise cause dangerous internal stresses.

Cleanliness in water supply for the system is emphasized as a major factor. Water should be free of solids, treated for chemical impurities, and checked for rust resistance. Although the main function of water is to cool the unit it is also aimed at maintaining a constant temperature. Class procedure covers operation of thermostats, water pumps, care and checks of radiator for damage to core from sulfur, and care and replacement of fan belts. One engine used in class (the Cummins L1690) has a fan with variable-pitch blades controlled by thermostat to help maintain even operating heat.

Hoses that leak or are collapsed on the suction side of the pump are a special threat to proper cooling.

In discussion of gas fuel systems, Boatman covers function and adjustment of both regulators and carburetors. He tells students to compare the carburetor to the welder's torch which is set for the greatest heat output. If the welder wants more heat he does not increase the pressure but gets a larger tip just as the engine man should set his carburetor for the greatest heat output. Then, if he wants more heat, he increases the size of the carburetor rather than changing its setting.

Sour gas encountered in West Texas is bad for engines, and students study construction and operation of "scrubbers" for cleaning the fuel. These units, which can be added by welding a steel chamber to the engine, provide cleansing with caustic soda, kerosine, and water.

Cleanliness of diesel fuel is another important point brought out in the course. The grade of fuel and its effect on the engine can be partly determined by watching exhaust color and temperature and by seeing that each cylinder has the same temperature.

Safety Training

Extreme caution in checking injectors is stressed as a means of preventing personal injury. "Fuel from a diesel injector can penetrate the flesh and cause blood poisoning for the careless operator," warns Boatman.

Engine clutches, their types, care, and adjustment, are final topics for discussion and demonstration in the course.

This is the second oil-field class developed in Odessa this year. Treating of crude-oil emulsions was formulated here early this year and presented to two groups as a trial course in April and May. It has been validated by the American Petroleum Institute which backed its development and will become an Odessa College special course starting in September.

Drilling-mud courses, which have now spread to every major producing area in the country as well as the new Canadian fields, were introduced in Odessa several years ago. The A.A.O.D.C. sponsors drilling-mud control schools.

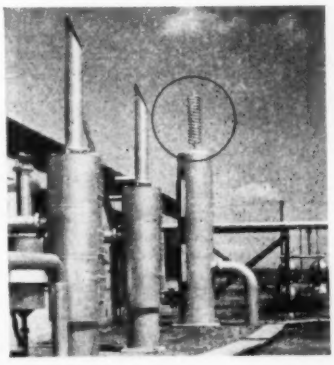
Students in the morning session of the engine course include James Duncan, member of Duncan Drilling Co.; T. J. Toft, tool pusher, Thompson-Carr, Inc.; Fred Forster, Jr., engineer, Thompson-Carr; Percy Lemasters and Eugene W. Seabolt, engine men for W. H. Black Drilling Co.; William Henry Measures, T. J. Gerlach, and R. E. Mills, engine men, Rowan Drilling Co., Inc.; W. A. Poole, engine man, Kerr-McGee Oil Industries, Inc.; T. W. Roberson, mechanic, Sharp Drilling Co.; B. L. Coughlin, sales manager, Westex Oil Co.; and Don Beck, driller, Thompson-Carr.

Enrolled in the evening class are J. W. Postelle, tool pusher, J. F. Postelle Drilling Co.; Carl Bently, tool pusher, and W. R. Holleman, driller, Thompson-Carr; S. F. Landrum and James R. Williams, engine men, Rowan Drilling Co.; J. R. Sharp, mechanic, Sharp Drilling Co.; E. D. Taylor and J. W. Maxwell, engine men, W. H. Black; Henry Kuhlman, mechanic, Kerr-McGee; Jack Williamson, petroleum engineer, Continental Oil Co.; Charles Rountree, Odessa branch manager for Westex Oil, and U. C. Darnell, field mechanic, Atlantic Refining Co.

Surge Tank and Vent Reduce Water Loss

IN closed cooling-water systems it is often necessary to vent trapped air and to provide for volume changes which may occur due to variations in operating conditions. Also it is desirable to keep water loss through evaporation to a minimum.

The accompanying photograph shows a surge tank and vent used in a cooling-water system at Cities Service Gas Co.'s recently completed Hugoton station. The surge tank provides the necessary volume for expansion in the system. The vent is the ¾-in. coil shown on the top of the surge tank. In addition to serving as a vent, the coil also provides condensing surface for vapor which when condensed drains back into the tank thereby reducing evaporative losses. Cities Service Gas Co. has found this device particularly of value in winter when antifreeze mixtures are used as a precautionary measure to prevent freezing in coils of aerial exchangers.



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LINE OF OIL FIELD EQUIPMENT ★ FOR PRODUCTION

DRILLING PRACTICES IN IRAN

by H. W. Lane, O.B.E.
Anglo-Iranian Oil Co., Ltd.

High formation pressures and other unusual factors pose problems which are being solved successfully

This is the first installment of a paper entitled "Modern Drilling and Production Practices in the Oil Fields of South Iran," which was presented in July at the Fourth Empire Mining and Metallurgical Congress at London. The author is one of the most widely known technologists of the petroleum industry who has been closely associated in an engineering and administrative capacity with the field developments in Iran over a period of many years. Installments explaining pressure-drilling techniques and other drilling practices will appear in the August 11 issue, and the final installment of August 18 will explain production practices.

Map showing producing oil fields and pipe lines in South Iran

THE oil fields of South Iran were the first producing areas to be opened up in this region and up to date they have produced a total of about 250 million tons of oil while at present they contribute about 6 per cent of the world's production. Since their discovery in 1908 these fields have maintained a steady increase in output and, as far as can be judged from information at present available, this upward trend seems likely to continue.

In this paper it is proposed to present a broad review of drilling and production practice in these oil fields, emphasizing some of the problems which face the technician in this somewhat isolated and difficult area.

Diversity of Opinion

Much has been written on the subject of oil-well drilling technique and a great diversity of opinion has found expression. There can, of course, be no standard technique, just as there is no standard oil well. Each field has its own special problems and each operator his remedies. Every well drilled has some peculiarity which at times seems to assume almost human characteristics. Some behave with perfect gentility and some with a fiendish perversity. Some require humoring and some must be driven. Each must be studied and the correct treatment meted out, but all, without exception, must be treated with unremitting care and watchfulness.

Drilling has been in progress in the South Iranian oil fields for 46 years and time has done nothing to simplify the drilling problem. In spite of a wealth of experience gained in exploring many areas and at depths down to over 11,000 ft. the solution to some of the difficulties has still to be found. The depths and pressures of these fields are as follows:

Field	Year of discovery	Depth range, feet	Pressures in reservoir, psi.
Masjid-i-Sulaiman	1908	1,000-3,500	450-750
Haft Kel	1927	2,500-4,750	1,175-1,800
Gach Saran	1928	2,750-7,500	2,050-3,500
Naft Safid	1934	3,000-6,300	3,000-4,000
Agha Jari	1937	5,000-9,000	3,150-4,500
Lali	1938	5,000-8,000	3,050-4,000

It will be seen from the figures given that although very deep drilling has not yet been necessary, in common with nearly all other oil-producing areas depths and pressures have increased with exploration and drilling difficulties have increased in about the same order. It does not necessarily follow that greater depth and higher pressures automatically complicate drilling, nor is it intended to convey the impression that all areas in South Iran are equally difficult. It happens, however, that those fields which are at present in course of development present problems which, because of the very high formation pressures, are somewhat out of the general run of drilling practice and which it is the purpose of this paper to describe.

1. DRILLING PROCEDURE

(a) General.—In general terms the purely mechanical operation of excavation is not difficult. Rock bits are used exclusively, since formations are predominantly hard and such soft beds through which the drill passes can be drilled almost as rapidly by suitable types of rock bits that it does not pay to change over to a drag-type bit.

Drilling speeds are low by world standards and although 250 ft. per day can on occasion be logged, the average footage is more in the order of 1,000 ft. per month. The reason for this comparatively slow rate of progress may be attributed to three factors: (1) Pressure conditions encountered in certain sections of the hole; (2) a rigid policy of safety, and (3) difficulties in servicing. Headings 1 and 2 are amplified later.

(b) Geological considerations in drilling.—The geological sequence of strata in South West Iran, from the driller's point of view, falls naturally into four divisions (refer Figs. 1, 2, and 3). The highest—the Bakhtiari and Upper Fars series—comprises up to 10,000 ft. of marls and sandstones, in which drilling difficulties are confined to water shows and considerable mud losses. This series is normally drilled with a plain, shale-water mud, with, or without, the addition of bentonitic material.

The next division, the Middle Fars and Lower Fars, Stages 3 and 2, averages 2,000 ft. in thickness and comprises marls, thick anhydrite beds, and thin limestones, and is notable for high-pressure water and gas shows. A shale-base, chemically treated, bentonite mud weighted with barytes is normally in use in these formations.

The Lower Fars, Stage 1, which follows, is a variable series of anhydrites, marls, salt, and limestones, which flows plastically under differential stresses, and may vary in thickness from nil to 10,000 ft. in the course of 2 or 3 miles. It gives rise to particular difficulties in drilling, including squeezing formation and mud contamination. The maintenance of stable bentonite suspensions throughout this rapidly changing formation, especially in thick masses of salt, is a problem peculiar to the division.

In this series salt-water shows are common. These shows can put up very high pressures, possibly due to the escape of gas from the reservoir below, which permeates the water-bearing formation and loads the fluid to full dome pressure. These conditions are so complex that it not infrequently occurs that the pressure of an upper show may be higher than that of a lower show, so that mud of a gravity necessary to hold in check flow from the upper show will be lost in the formation of the lower show because of the high differential pressure. This differential increases as the hole gets deeper and mud ringing and losses to the formation often become so serious that progress is completely arrested. Cement also is rarely effective, since the salt water dilutes the cement and destroys its action. If, on the other hand, mud is of insufficient gravity, that portion standing in the hole between the two shows will become diluted by the interchange of salt water which takes place between the two shows. The aim, therefore, is to deal effectively with each show as it is encountered.

At the base of this division occurs the cap rock, a largely anhydrite formation, average 100 ft. in thickness, which gives an invariable warning of the approach to the immediately underlying oil-bearing Asmari limestone.

The Asmari limestone series may be up to 1,500 ft. in thickness and is dominantly a formation of bedded and massive, varying porous and fractured limestones, with some anhydrite and mary beds in the lower portions. Pressures within the oil and gas zones are frequently high and require a high degree of flexibility in pressure control. Such conditions are prevalent in most of the Iranian fields and a great deal of thought and practical experiment has been put into the methods of drilling through these difficult zones. Though very careful mud control is sometimes successful, the most difficult method so far tried is that of pressure drilling.

(c) Casing.—Two casing programs are in use. For wells which are drilled in areas where high pressures are expected and where special technique must be employed "inserted joint casing" is used. This type of casing is specially suitable for pressure drilling wells where extreme depth is not an objective, since the design of the joint allows it to be run into a well under high pressure through a packer with greater safety than the collar type.

In wells where more normal drilling conditions exist standard A.P.I. collar casing is run. For deep strings where

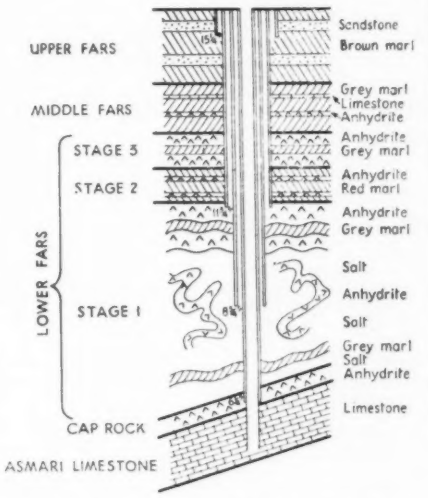


Fig. 1—Stratigraphical diagram of a typical well, showing the casing program

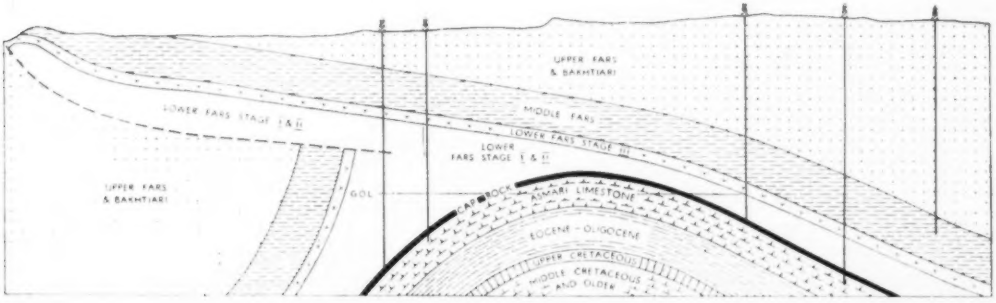


Fig. 2—Section through the Agha Jari structure

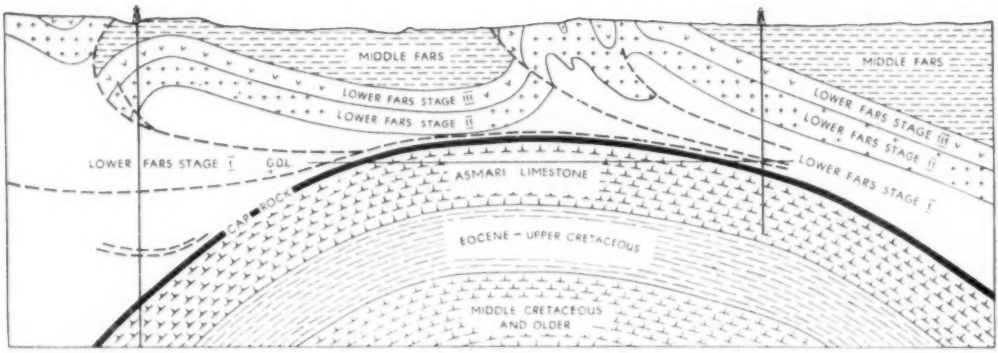


Fig. 3—Section through the Gach Saran structure

clearances are small extreme line casing is used. This casing employs a special joint having a high tensile efficiency (80 to 100 per cent) and streamlined external and internal form which minimizes friction in a packer or in the open hole and reduces pumping pressures.

(d) Well program.—Drilling is commenced in $19\frac{1}{2}$-in. hole, using $6^{5}/_{8}$-in. drill pipe and carried to between 500 and 1,000 ft. where 16-in. A.P.I. casing is cemented to form an anchor string.

A well head which includes a 15-in. valve and Cameron gate are fitted and drilling is continued using a $14^{3}/_{4}$-in. bit to a point between 3,000 and 3,500 ft. In most areas this depth takes the well to a point at the base of the Stage 3 in Lower Fars and water shows in this section of the hole can be shut off. Here $11^{3}/_{4}$-in. casing is cemented to surface, after which the well is rigged up for pressure drilling and a special well head installed.

Using a $10^{5}/_{8}$-in. bit run on $4\frac{1}{2}$-in. drill pipe the hole is then carried to a depth of 5,000 to 6,000 ft. This section of the hole is extremely difficult and the system of drilling is described in a later section; $8^{3}/_{4}$-in. casing (I.J.) is cemented at a point designed to shut off as much as possible of this troublesome formation and the hole is continued to cap rock with a $7^{3}/_{4}$-in. bit, $6^{1}/_{4}$-in. I.J. casing being run and cemented in cap rock. A special drilling in well head is here installed and drilling in for production is commenced. All casing strings are cemented to surface and tested to full pressure before drilling is recommended.

2. MUD TECHNIQUE

Most of the drilling muds in use in these fields are made from a base of gray calcareous marl. With this material fresh water mixtures can be made up to 1.28 sp. gr. having reasonably low viscosities. Sealing compounds, weighting materials, viscosity reducers and gelling compounds are added to suit required conditions. Salt water mixtures can be made up to 1.45 sp. gr.

The qualities required in a mud flush for oil well drilling are:

(a) Specific gravity.—The flush must always apply not only pressure but the correct pressure to the formation whether to balance a water or gas show or simply to prevent weaker formations from caving or squeezing.

(b) Settling rate.—If the solid matter (clay, rock cuttings, etc.) in the flush tends to settle out, even slowly, it is liable to drop to the bottom of the hole and there pack round the bit.

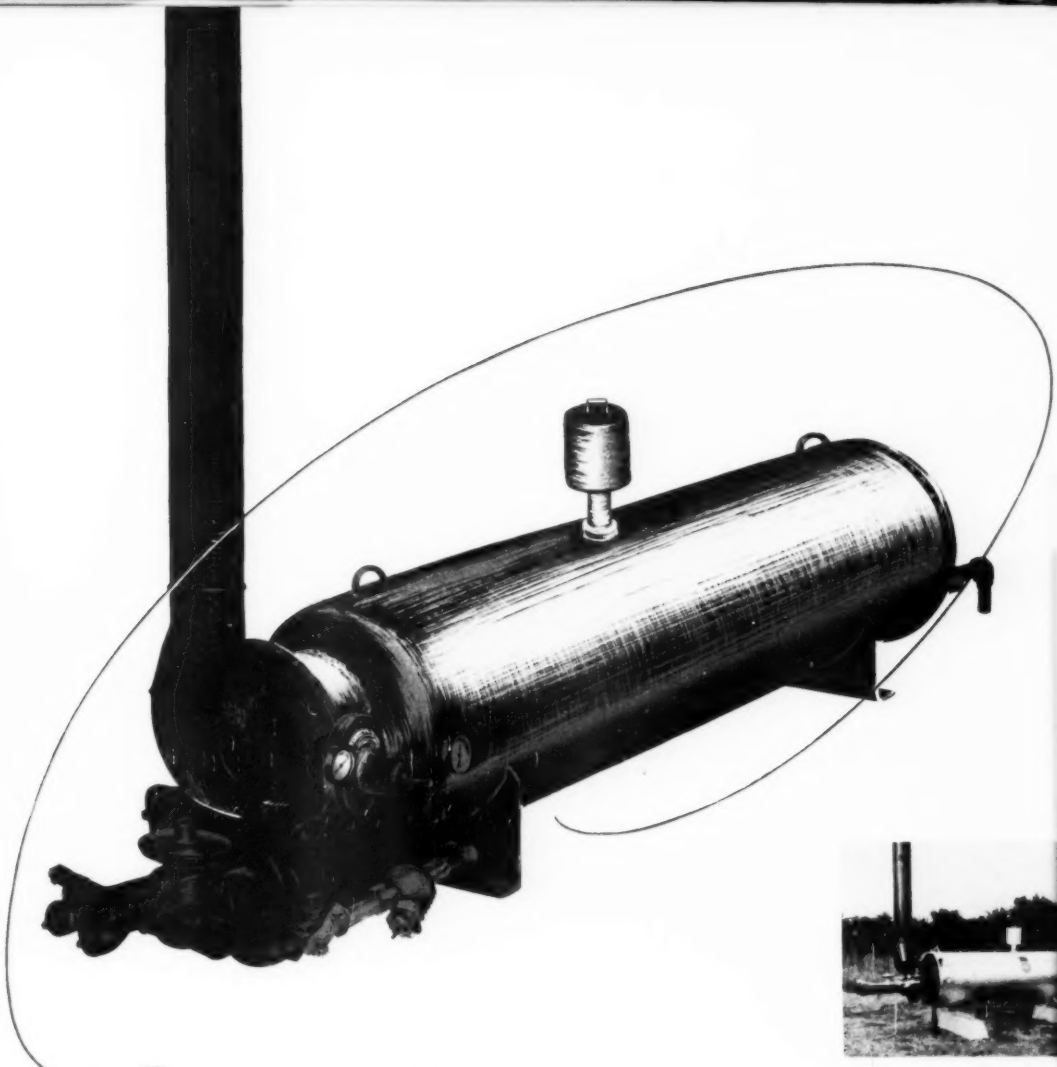
Fig. 4

STANDARD MUD PRACTICE CHART.

IN DRILLING THROUGH THE FORMATIONS COMMONLY MET IN THE FOOTHILLS ZONE OF S.W.IRAN, CURRENT PRACTICE MAY BE THUS SUMMARIZED

FORMATION			CASING				MUD								POSSIBLE DANGERS	EMERGENCY MUD CONTROL
NAME	THICKNESS	DESCRIPTION	15"	11"	8"	6"	TYPE	AVERAGE CHARACTERISTICS								
								S.G.	VIS.	SAL.	P	S.R.	C.M.			
BAKHTIARI UPPER FARS	0 TO 4000	CLAY, SILTS, SANDSTONES CONGLOMERATES RED MARLS, OCCASIONAL GREY MARLS, GREY AND BUFF SANDSTONES	24 HOLE STRING TO 250-750'	TO 3000-3500'	FOR SHUTTING OFF ANY WATER ZONES & BODY CAVING FORMATIONS	CAP ROCK	FRESH WATER SHALE SHALE/FUEL OIL	1.23	25	1.0015	315	0.25	6.0	POROUS SANDSTONES (eg POROUS & CAVERNOUS SST)	MUD OF LOW PERMEABILITY TO SEAL OFF FORMATION BENTONITE ADDED IN SPECIAL CIRCUMSTANCES VISCOUS SHALE MUDS & SHALE CEMENT SLURRIES WITH CELLOPHANE, STRAW, COTTON SEED BUNNY ADDED TO SEAL OFF IN VERY BAD CASES CEMENT OFF
								1.20	37	1.0019	260	0.15	8.0			
							NORMALLY HOLE ALLOWED TO MAKE MUD THROUGH ABSORPTION OF CLAY FROM FORMATION									
MIDDLE FARS	600' TO 2500'	GREY AND RED MARLS, SANDSTONES AND LIMESTONES IN CENTRAL & NORTHERN AREAS GREY MARLS & LIMESTONES IN SOUTHERN AREAS						AS ABOVE							AS ABOVE (POROUS LIMESTONES)	AS ABOVE
LOWER FARS STAGE III	650'	ANHYDRITE, GREY MARL AND LIMESTONE (RED MARLS PRESENT IN CENTRAL AND NORTHERN AREAS)					FRESH WATER/ SHALE (NORMAL)	1.25	30	1.0020	340	0.25	8.0			
							SHALE/BRINE FUEL OIL	1.37	35	1.2000	350	0.20	6.5	SATURATED BRINE MUD TO DRILL THROUGH SALT ZONES IN LOWER FARS		
LOWER FARS STAGE II	200' TO 800'	ANHYDRITE, RED MARL, LITTLE GREY MARL, THIN LIMESTONE (PROBABLY SALT TOWARDS BASE MARLS SALTY & GYPSEOUS VEINED)					SHALE/ BRINE BAR/FUEL OIL	1.83	45	1.2000	500	0.20	6.0	MUD WEIGHTED TO OVERCOME HIGH PRESSURE WATER SHOWS & CAVING FORMATION	BACK PRESSURES APPLIED ENABLING MUD WEIGHT TO BE REDUCED & SO HYDRIL VISCOSITY & PERMEABILITY	
LOWER FARS STAGE I	100 TO 1,000'	RED & GREY MARLS ANHYDRITE & LIMESTONES & MUCH SALT IN PLACES (MUCH FAULTING IN THIS GROUP)				TO 5000-6000 ON STRING SEATED IN CAP ROCK									AS ABOVE	AS ABOVE
CAP ROCK	60 TO 200					TO MIDDLE OF CAP ROCK										
ASMARI LIMESTONE	650' TO 1300						SALT BENTONITE	1.35	30	1.0030	80	0.05	6.0	DEPENDING ON ROCK PRESSURE + 200-250 lbs/in² TO BALANCE TO IMPROVE THE MUD AND PREVENT MUD RINGING IN THE LIMESTONE 10% BENTONITE 90% WATER MIXTURE & SODIUM HEXAMETAPHOSPHATE ADDED TO REDUCE THE VISCOUS MUDS QUEBRACHO AND SODIUM HEXAMETAPHOSPHATE ADDED	
							OIL BENTONITE	1.70	55	1.0020	80	0.10	5.0			

N.B. (1) IN GYPSUM & GYPSEOUS FORMATIONS, PHOSPHATES ARE NOT USED BECAUSE BASE EXCHANGE RUINS THE COLLOIDAL CHARACTER QUEBRACHO USED INSTEAD TO REDUCE VISCOSITY
(2) BENTONITE SHOULD NOT BE ADDED TO A BRINE MUD BUT SALT CAN BE ADDED TO A MATURED FRESH WATER/BENTONITE MUD
(3) FUEL OIL MUDS & BRINE MUDS TEND TO AIR-CUT



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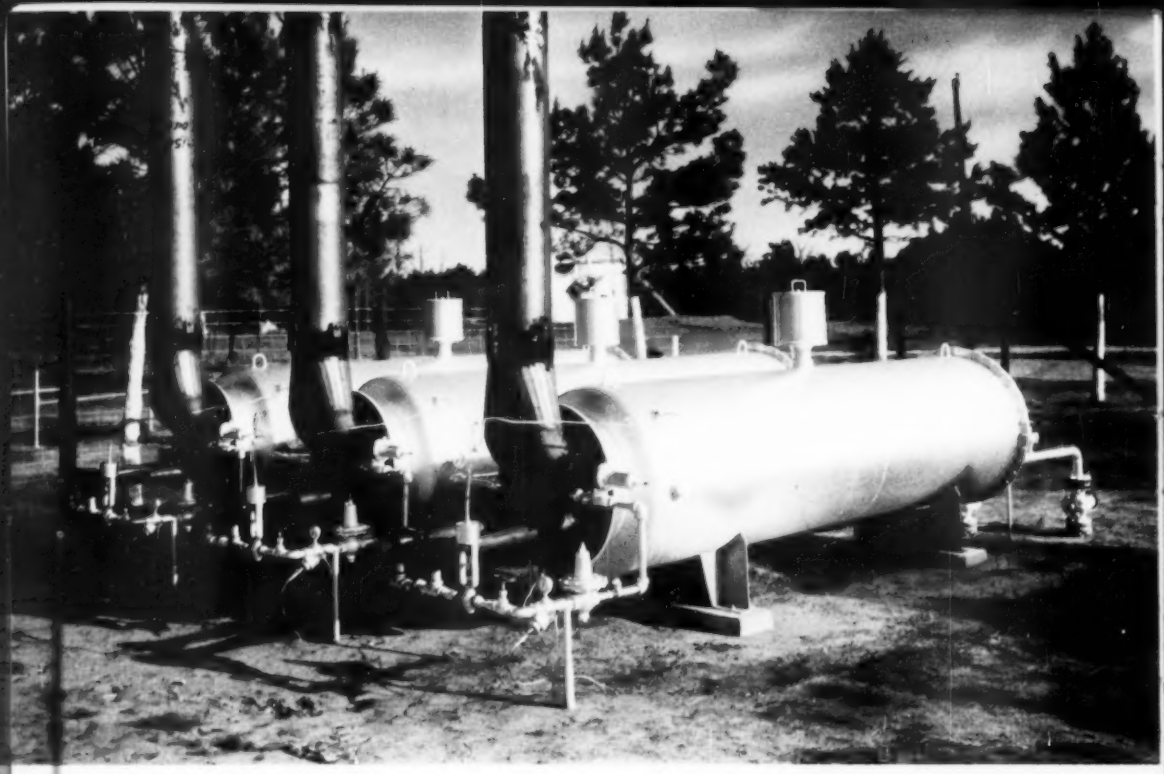

BS&B's New 70 Series Indirect Heater
The SAFE, ECONOMICAL Heater

* For difficult heating problems, for easy heating problems . . . for gas, for oil, for any combustible fluid, you can't beat the new BS&B 70 Series Indirect Heater.

The new BS&B 70 Series Indirect Heater provides for careful water bath heating of gas or liquids and combines the advantages of the tubular heat exchanger with the efficiency of a built-in furnace. It is designed to heat gases or liquids over a wide range of pressures without resorting to a high pressure shell or to special designs for each problem. It is the most efficient heater of its kind.

1. Saves natural fuel gas . . . because of the high overall thermal efficiency . . . 70% or above at the heater's rated capacity, the 70 Series Indirect Heater offers a considerable saving in fuel gas. This is due to the scientific application of the principles of immersion coil heating used in the heater.

2. Greater flow tube surface . . . each flow coil is designed with a balanced number of square feet of flow tube surface to give a balance between heat input capacity to the water bath and heat absorbing capacity of the flow tube bundle.

3. Efficient firebox . . . the firebox yields the same high efficiency at low or at high firing rates. The rated capacity is only 80% of maximum capacity. The firebox has ample surface, completely streamlined flow characteristics, plenty of draft and best air-gas carbureting devices. Gas burns evenly giving full advantage of radiant and convection heat transfer.

4. A heater for every job . . . The BS&B 70 Series Indirect Heaters are fabricated in several sizes ranging from 250,000 to 4,000,000 BTU per hour input. The largest unit can heat as high as 40,000,000 standard cubic feet of gas per day.

You will want to know more about the new BS&B 70 Series Indirect Heater. Write for our new informative catalog. Send the coupon today.

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Director, Special Products Division, BLACK, SIVALLS & BRYSON, INC.
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(c) **Viscosity.**—This might be better called pumpability or stiffness, which, if allowed to get too high may be difficult to handle in the pumps and drill pipe.

(d) **Permeability.**—The most important of the functions of a drilling mud is that of putting a thin, impervious sheath on the wall of the hole so sealing the pores of the formation and preventing the expression of water from the mud thus building up a filter cake or mud ring which reduces the size of the hole and may jam the bit.

pH value.—The salt content of a mud is commonly expressed as a pH value. Changes in acidity or alkalinity brought about by drilling into formations containing salts react upon all the above qualities of a mud. The explanation of this action is that the molecules in a clay obtain their gelling property by a natural dispersive (repellant) electric charge. Any charge inducing attraction results in flocculation with loss of viscosity, wall building and suspensory value. A change in pH value usually means that a new specification must be built up.

A mud which has been designed to cope with any given set of circumstances must be kept to the right specification until those circumstances change. To insure this the mud in service must be sampled continuously and put through routine tests; if any of these tests indicate that it has departed from specification it must be immediately reconditioned. So important is this that, once correction is called for, drilling must be shut down if necessary until the flush has been put right, since an unsuitable mud will endanger or even wreck a well.

Chemicals normally used in building up suitable mud mixtures are:

Bentonite - Aquagel - Gelsil: A finely divided clay which can absorb water to form a gel on standing but is fluid on agitating. It is used to improve permeability and suspensory properties.

Haematite - Barytes - Baroid: Used to increase the weight of muds.

Sodium Hexametaphosphate: Used to reduce viscosity in muds. It has also the effect of reducing permeability. Is unsuitable for drilling in anhydrite as the reaction of the phosphate produces a mud of strong gel properties.

Cellophane-Gel Flake: Used to assist in sealing very porous or fissured formation. Is readily pumpable and does not affect the quality of the mud.

Mica: As cellophane, but is brittle and tends to break up.

Stabilite: A material used in highly gelatinous muds for reducing viscosity without increasing the tendency to gel.

Sodium Silicate: Used for mudding off wells when a permanent seal is required.

Quebracho: A form of tannin. Used for reducing viscosity without affecting other properties.

Magnesium Chloride: For reducing viscosity when weight alone is important.

It is often possible to protect the material of a drilling mud by the addition of oil and it has been found that if 2 per cent of fuel oil is thoroughly gunned into the mud the basic particles become coated in such a manner as to arrest reaction with the chemicals introduced from formation.

Recent experiment with carboxymethylcellulose (cellofas) have proved most successful in this direction and it is possible that the use of this chemical will enable mud to be kept in condition under most severe conditions.

The application of the various mud mixtures to conditions in these fields is shown in the mud chart, Fig. 4.

Small Plane Services Widely Scattered Rigs

Appell Drilling Co., Alice, Tex., uses a four-place airplane for constant jack-of-all-trades cargo and personnel transport in its drilling operations. For over a year the company has depended on the plane for servicing its rigs scattered over the Southwest and Gulf Coast areas of Texas. Virtually every day, usually in company with Bill Appell, the owner, or some other executive of the firm, W. O. (Bill) Poole, veteran pilot and tool pusher, flies from the company's main office in Alice to one of the field sites where Appell's rotary rigs are employed.

Poole, the pilot, says "we've had so many 'important' and 'unusual' trips in our plane, we long ago gave up trying to set apart any particular ones. Use of the plane is simply routine business practice. A lot of our jobs are located in the remote and hard-to-get-to brush country. We've made air transportation in such cases an easy matter by often going in with a bulldozer immediately and clearing our own small landing strips right alongside the rigs."

To keep the rigs working without a complete shutdown, Appell Drilling flies in repair parts to handle machinery breakdowns. This is even done at night, taking care for navigation.

If, at a new rig location, there isn't some sort of clear area, road, or other place halfway suitable to land on close up to the rig, the company takes a bulldozer and scrapes out a strip about 1,500 ft. long. About 85 per cent of all the landings and takeoffs are in and out of isolated, unimproved places where there is only 1,000 ft. or less of open ground.

Typical of the Appell jobs is the B-38 Driscoll now being drilled for Continental Oil Co. in Duval County, just west of Benevides, Tex. The drilling contractor flies in for conferences with Continental field superintendents, as well as for regular inspection of construction work in progress by Heldt Brothers Contracting Co.

Another rig of Appell Drilling recently has been moved to location on the north edge of Mathis Lake northeast of Alice. To reach this site with a surface vehicle from the main office takes 2½ hours, while the plane completes the trip in 20 minutes. After buzzing the rig as a signal, the plane is set down on an improvised strip.

Length of the drilling-rig runway, which edges to the base of the location and trails off at one end into the lake, is about 1,000 ft., with width varying between 40 and 50 ft.

On an ordinary flight to the Mathis Lake location, the pilot will carry as many as four 75-lb. drill bits in addition to passengers.

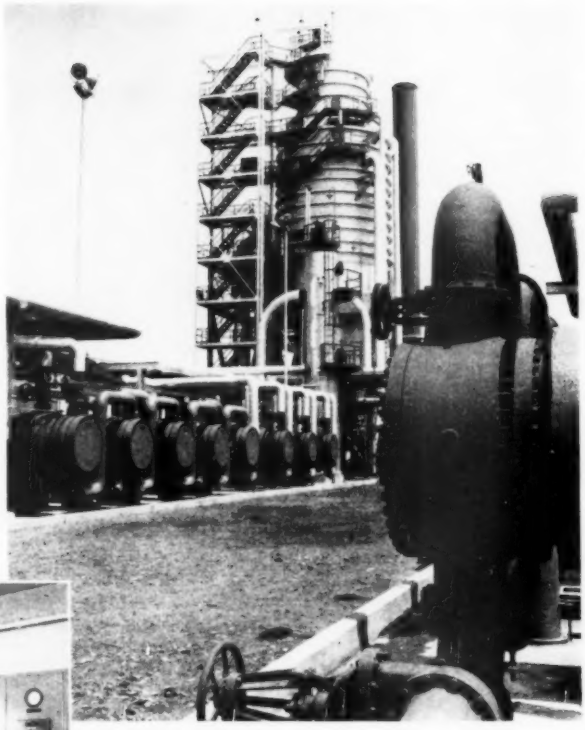
Totaling all maintenance items (gas, oil, repairs, storage, etc.), Appell accountants calculate the operating costs for the plane, which is a four-place Navion, at about $5.38 per hour.

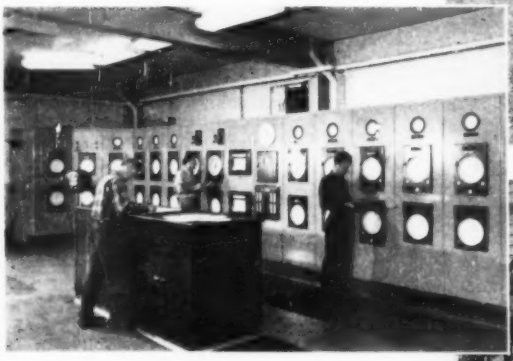
Left: This rig at Mathis Lake is only 20 minutes' travel from the Alice, Tex., office of Appell Drilling Co. Traveling time to the location is about 2½ hours by motor vehicle. Below: Appell's plane brought owner Bill Appell, right, and pilot-tool pusher Bill Poole direct to the site of a new location. An adjacent dirt road served as the landing strip

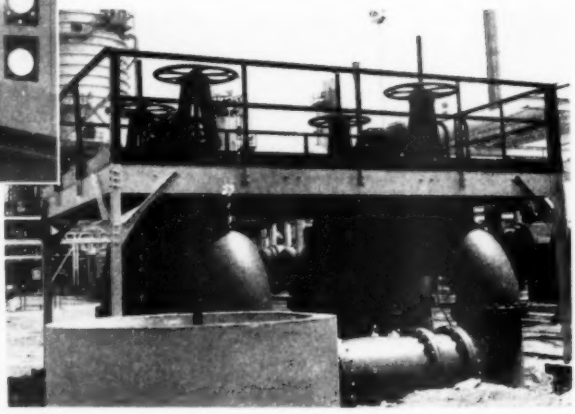
Right: In two banks of 18 shell-and-tube exchangers, charging stock is raised from 430° to 595° F. by heat exchange with product and pumparound streams from the fractionator. Heat-transfer surface in the exchanger section totals 34,000 sq. ft. Further heat removal from the unit is utilized to generate 35,000 lb. of steam per hour

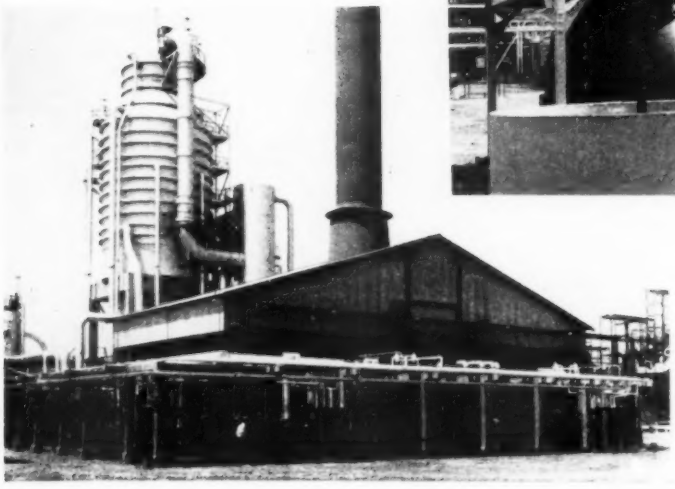
Below: Modern instrumentation and control make the vacuum unit sufficiently flexible to handle various combinations of bottoms from the several crudes fractionated in the refinery's atmospheric crude units. This control room is housed in the same building with modern locker and wash rooms

Bottom of page: The furnace, designed for a heat input of approximately 1.94 million B.t.u. per hour, takes preheated charge at 595° F. Furnace outlet temperature averages 800° F. The fractionation tower is designed to operate at 2.5 in. Hg. absolute pressure









Double strainer assembly on salt water supplied to unit at a maximum water design rate of approximately 14,000 g.p.m.

Esso Standard Places

Giant REDUCED CRUDE UNIT on Stream

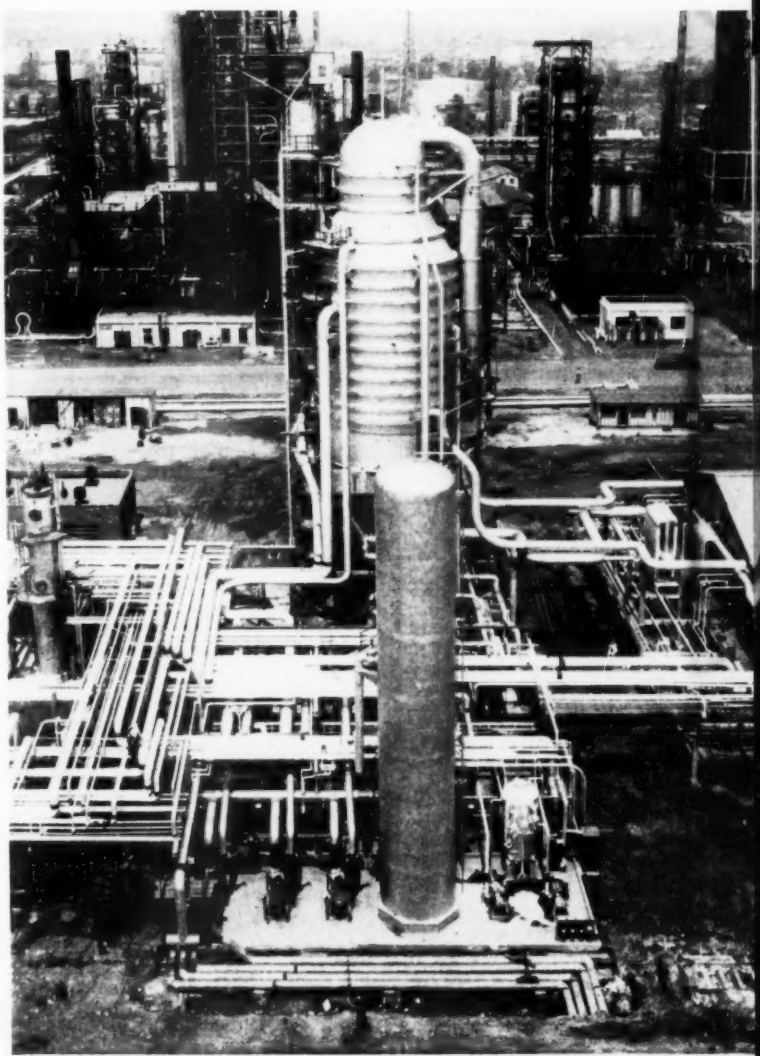
by George Weber
Refining Editor

INITIAL runs are being conducted by Esso Standard Oil Co. on a new vacuum pipe still recently completed at the Bayway refinery at Linden, N. J. With a rated capacity for 49,000 bbl. of reduced crude per stream day, this unit is one of the largest of its kind in the world.

The unit is designed to provide a heavy distillate feed stock for the 41,000-bbl.-per-stream-day fluid catalytic cracking unit to be completed later this summer. These two major units of the record Bayway expansion program will enable operators to increase gasoline output and at the same time reduce the yield of residual products. The vacuum unit was designed by Standard Oil Development Co. and constructed by C. F. Braun & Co.

The 93-ft. vacuum tower comprises three sections. At the base is the stripping section for heavy bottoms. The central section, 27 ft. in diameter, consists of the flash zone, a wash section, a lower pumparound or reflux section, and a product condensing and removal section. In the smaller diameter top of the tower, upper pumparound and product condensing and removal take place. The resulting reduction of ash content of the overhead product enhances its value as catalytic cracking stock.

The plot plan for the entire vacuum unit allows ready access to all sections for easier maintenance and inspection either during normal operation or turnarounds. Heavy bottoms from the unit will be thermally visbroken for further yield of residual bottoms and gasoline.



The huge vacuum flasher adds no crude capacity to the Bayway refinery at Linden, N. J., but provides a further reduction of atmospheric topped crudes. Reduced crude charge enters the unit at the 10 by 50-ft. feed surge drum, foreground center. After preheating in two exchanger banks, it is charged to the furnace, right, and flashed to the 93-ft. main fractionation tower, center. The heavy vacuum distillate withdrawn overhead is combined with atmospheric gas oil to make up the feed stock for the new fluid catalytic cracking unit

Spencer Chemical Plant

(Continued from page 44)

monia, free of nonbasic gases, moisture, and oil, is prepared in the refrigeration ammonia plant and loaded into various-sized cylinders for distribution. Ammonia of high purity is a popular and effective commercial refrigerant.

For carbon dioxide recovery, a new plant recently was designed and constructed by Spencer at the Jayhawk works to recover carbon dioxide from ammonia process gases. The CO_2 subsequently is processed into dry ice, and as reactant in the preparation of synthesis gas for methanol manufacture. Approximately 120 tons per day of carbon dioxide of 99.5 per cent purity is recovered. The dry ice plant itself can produce approximately 50 tons per day of dry ice (solid CO_2) and is delivered by Spencer for use by meat-packing establishments, ice cream manufacturing concerns, beverage carbonators, etc.

In the aqua ammonia plant, ammonia and water are combined and the heat of reaction removed to produce a low-vapor-pressure solution. This lends itself to easy transfer, bottling, handling, and so on.

In the nitric acid supplementary plant, nitric acid can be packaged in carboys and prepared for shipment.

In the methanol distillation and recovery plant, 21,000 gal. per day of methyl alcohol can be fractionated to produce a final product of extremely high purity, as a chemical intermediate and for consumer use. Methanol of course has good antifreeze properties, is a base chemical for the manufacture of several types of plastics, and is in demand as a chemical solvent.

The methanol storage and packaging unit has storage capacity equivalent to 5,000 bbl. of crude and 40,000 bbl. of refined methanol, together with facilities to barrel the product or load in tank cars for shipment.

Utilities Requirements

Besides natural gas as a raw material, the plant requires large quantities of water, steam, and electricity for process operations. The circulating water system is so large that 8,000,000 gal. of water per day are required to replace just the losses through evaporation, windage, and purge. The water is obtained from the adjacent Spring River, screened, clarified and softened, and treated by various methods depending on its ultimate use as boiler feed or process water.

Capacity of the hot process softener for one type of boiler feed water is 1 million pounds of water per hour. Apart from the above, 20,000 gal. of water per day is pumped from a deep well and chlorinated for sanitary use.

Steam is generated at 625 psig. and 760° F. in five boilers whose combined capacity of 1,000,000 lb. of steam per hour makes the Jayhawk works the largest steam plant in Kansas. The steam is reduced at 275 psig. in four turbogenerators capable of producing 29,000 kva. The 275-psig. steam flows to the ammonia plant at the rate of 10 million pounds per day to drive the gas compressors located there.

Service and maintenance facilities are large because of the specialized nature of the equipment and the large size of the operation. A large stores inventory is kept. In the mechanical department, complete services are rendered by well-equipped electrical, machine, welding and boilermaker, sheet metal and forge, plumbing, carpenter, paint, and instrument shops. A garage staff maintains the motor fleet and other moving equipment. Facilities are provided for the maintenance of the Spencer tank-car fleet and the works' diesel locomotive.

In addition to the functions normal in administration and operation, it is necessary to maintain a guard force for plant protection and property control, fire-fighting equipment and auxiliary personnel to protect the plant from fire hazards, and a first-aid dispensary and safety department. In connection with the last, the item may be of interest that the sterilizing and reconditioning of the various types of gas masks and respiratory equipment requires the full-time attention of one man.

The Spencer Chemical Co. plant in its original form was launched under a prime contract for construction and operation as Jayhawk Ordnance Works. Contract execution was between the War Department and the Spencer company, then known as Military Chemical Works, Inc., on September 10, 1941.

First portion of the plant went into operation January 21, 1943. The plant was completed 3½ months ahead of schedule and for nearly $4,000,000 less than the estimated cost. The plant was brought up to designed capacity within 5 days after the last equipment was installed and it consistently operated at 130 to 140 per cent over its designed capacity. Over 300,000 tone of ammonia alone were produced in the 30 months of the War Department program.

The plant continued operating under the War Department contract through V-E Day and through V-J Day until on June 2, 1946, the War Department contract was canceled for the convenience of the Government, and simultaneously Spencer Chemical Co. commenced operating as a private enterprise.

$10 Worth of Natural Gas—$1,000 Additional Corn

THE Spencer Chemical Co. operation is a good example of integration with the economy of the area in which it is located. It processes raw materials (natural gas) from the area into products which are needed by the area—products which further increase the success and prosperity of other activities in the area.

A good example of this can be had from following the economic values of the basic raw materials used by this plant through their processes to the final consumer. The quantities of natural gas (and coal, unless natural gas also is used for power generation) required by Spencer for the basic raw materials for a ton of anhydrous ammonia would sell **as fuels** for approximately $10. However, by putting natural gas through the large and complicated plant which involves very substantial capital investment for equipment and supplies and employment of about a thousand men and women, the natural gas is "upgraded" into much more valuable commodities.

A finished ton of ammonia thus obtained by the upgrading sells for approximately seven times the cost of the original quantity of natural gas required as raw material. The difference between the raw material cost and the final selling cost has been, of course, expended as payroll, payment for supplies, and further capital investment.

Some of these tons of anhydrous ammonia may be sold as such; other tons are processed through further stages to produce nitric acid, ammoniating solutions, and solid fertilizer-grade ammonium nitrate. Let's take a single ton of anhydrous ammonia which has been processed into ammonium nitrate. This requires further labor, capital, equipment, and supplies and results in increasing the value of the original quantity of natural gas many times.

This original $10 worth of natural gas, processed from 1 ton of anhydrous ammonia into 2 tons of nitrate fertilizer, is sold to a Kansas farmer for about $140, delivered. As a result of the application of these two tons of material to 40 acres of corn, the farmer receives an additional yield of about 720 bu. which at today's prices returns to the farmer about $1,000 of additional income.

In one outstanding Central Missouri test, the yield of corn was 51.4 bu. an acre where no fertilizer was used. When 125 lb. of ammonium nitrate were applied as the only fertilizer, yield was 93.4 bu., an increase of 42 bu. made by 1¼ sacks of ammonium nitrate. In this case, nitrogen probably was the principal plant food lacking.

Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Pipes and Tubing

APPROXIMATE COST INDEXES (1946 = 100)

	Copper base tubes*	Lead pipe†	Black pipe‡	Boiler tubes‡	Refinery labor¶
1926	93	99	108	85	58
1928					57
1929					59
1930					57
1931	78	59	101	90	57
1932	59	50	100	63	48
1933	64	64	90	97	49
1934	66	58	100	87	55
1935	62	47	100	88	58
1936					60
1937	82				65
1938	76	64	98	94	67
1939	80	68	92	92	68
1940	84	69	93	92	69
1941	87				71
1942	87	82	92	92	79
1943	87	82	93	92	87
1944	87	82	92	92	90
1945	87	82	93	92	94
1946	100	100	100	100	100
1947	110	200 est.	119 est.	118 est.	109
1948	136	210	145 est.	141	126
1949 April	141	192	152	151	§135

***The variations in the cost of expensive materials such as cupro-nickel are much less. Personal files and Code 485 of Wholesale Prices, U. S. Dept. Labor, Bureau of Labor Statistics. †Code 475 of Wholesale Prices. ‡Codes 409.2 and 435.1 of Wholesale Prices. §January. ¶Cost-imating No. 1, Oct. 21, 1948, and No. 40, July 21, 1949. The Oil and Gas Journal.**

THE pricing of pipe and tubing is so complicated that only gross approximations can be given here. Much more complete information is given by Schrader,[1] and Bliss,[2] but their prices do not agree with one another nor entirely with the values given on this page. Per pound costs for steel such as those published by Happel, Aries, and Borns[3] (5-7 cents per pound for pipe and 6-10 cents per pound for seamless tubing) are satisfactory for large-diameter material but not for exchanger or condenser tubing.

References

1. Schrader, R. J., Estimating Chemical Piping Costs, Chem. Eng., Jan. 1947, p. 109.
2. Bliss, H., Chemical Engineering Economics by Tyler, 3rd Ed., McGraw-Hill Book Co., Inc., New York, 1948.
3. Happel, Aries, and Borns, Equipment Costs, Chem. Eng., Oct. 1946, p. 99.

TABLE 1—APPROXIMATE COST OF STANDARD, EXTRA HEAVY, AND SEAMLESS STEEL† PIPE*
(Dollar per foot—1946)

	Lap or butt weld pipe		Seamless pipe		
Pipe size (in.)	Standard Sched. 40 (and 30)	Extra heavy Sched. 80 (and 60)	Sched. 20 (300 lb.)	Standard Sched. 40 (and 30)	Extra heavy Sched. 80 (and 60)
½	.06	.08			
1	.12	.15			
1½	.18	.24		.21	.29
2	.23	.30		.27	.38
3	.45	.62		.57	.77
4	.59	.82		.81	1.12
6	.95	1.43		1.33	2.00
8			1.57	1.86	3.03
10			1.83	2.43	
12			2.17	2.85	
16			2.74	4.14	

*Based on 5-7 cents per pound for common pipe and 6-9 cents per pound for seamless. †Other pipe materials than steel require the following approximate multiplier factors:

No. 304 stainless steel	18.0 (very large 14)
No. 316 stainless steel	25.0 (very large 20)
No. 347 stainless steel	22.0 (very large 16)
Galvanized	1.2 (very small 1.6)
Copper	3.0
Brass	5.5
Monel	21.0
Nickel	35.0 (large or small 25)
Saran	5.5-7.0
Glass	5.0-8.0

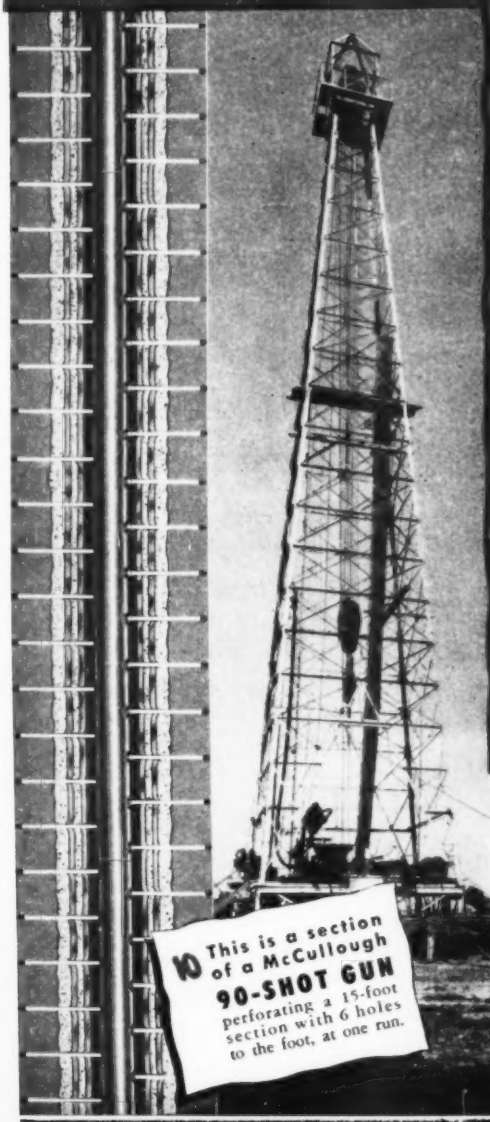
TABLE 2—APPROXIMATE COST OF SEAMLESS STEEL TUBING*
(Dollars per foot, 1946)

		Approximate cost, dollars per foot			
Tubing size, o.d., in.	Gage, B.w.g.	Steel	Stainless	Admiralty	4-6 Chrome
⅝	14	.12	.70	.21	.36
	16	.11	.64	.17	.33
	18	.10	.58	.14	.30
	20	.08	.47	.10	.24
¾	14	.12	.74	.25	.36
	16	.12	.72	.20	.36
	18	.11	.66	.17	.33
1	12	.15	.90	.44	.45
	14	.13	.78	.35	.39
	16	.12	.73	.28	.36
	18	.12	.72	.22	.36
1¼	10	.19	1.20	.66	.57
	12	.17	1.07	.55	.51
	14	.15	.94	.43	.45
	16	.13	.82	.35	.39
	18	.12	.75	.27	.36
1½	10	.22	1.43	.78	.66
	12	.21	1.36	.65	.63
	14	.16	1.04	.52	.48

*Referred to steel, monel tubes cost about 8 times, and nickel about 10 times. Referred to admiralty, copper costs only 50-70 per cent.

No. 42 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

10 GOOD REASONS WHY OPERATORS PREFER



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1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically; guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from ⅛" dia. up to ¾" dia., to fit every possible need.
7. **BURRLESS BULLETS**, giving a completely burr-free hole, eliminating casing scraping, with *no* sacrifice of penetration.
8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

These Are Some of the Reasons Behind the Proven Fact That

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EXPORT OFFICE: 30 Rockefeller Plaza, New York 20, N. Y.

ENGINEERING fundamentals

Phase Concepts—Phase State of Reservoirs

PETROLEUM reservoirs are sometimes classed according to the fluids they produce. For example, "dry gas reservoir," "oil reservoir," and "condensate reservoir" are three such qualifying terms. It is of interest to examine concepts of phase behavior to illustrate the variation of conditions which give these different reservoirs. There are three conditions that determine the phase state of fluids within the reservoir and as produced from the reservoir. These factors are (1) the composition of the reservoir hydrocarbon mixture, (2) the pressure and temperature on the reservoir, and (3) the pressure and temperature of the surface production. It is considered in making this statement that the fluids both within the reservoir and at the surface are in phase equilibrium.

Consider the hydrocarbon mixture whose phase diagram is shown in Fig. 1. Consider further that the surface pressure and temperature at P and T as marked. If a reservoir containing this hydrocarbon mixture were found at the pressure and temperature P_1, T_1, the reservoir would be said to be an oil reservoir containing undersaturated crude oil (i.e., above its bubble point). Furthermore, under the assumed condition of phase equilibrium within the reservoir there would be no gas cap. The reservoir pressure and temperature illustrating this case could be anywhere in the region to the left of the critical point C and above the bubble-point line.

The reservoir containing this hydrocarbon mixture might also exist originally at some temperature and pressure P_2, T_2 below the bubble-point line. Such a reservoir would contain saturated crude oil and would possess a gas cap assuming that phase equilibrium existed. The ratio of gas-cap volume to reservoir oil volume would be given by the appropriate per cent liquid line on the diagram. A reservoir existing at equilibrium at any temperature and pressure within the two-phase region would possess a free gas cap.

A simple statement of the position of the reservoir pressure and temperature with respect to such a diagram as Fig. 1 does not suffice alone to describe the type production at the surface. The relative position of surface pressure and temperature must also be stated. Should the relative position of surface pressure by P'' rather than P, the surface production would be as single-phase vapor.

The relative position of surface pressure and temperature with respect to reservoir pressure and temperature is an indication of the produced oil gravity, the surface gas oil ratio, and the formation-volume factor. For example, should the relative position of the surface pressure and temperature be P', T' rather than P, T, the gas-oil ratio at the surface conditions would be higher, and the formation volume factor greater.

The surface pressure and temperature cannot be changed at will, however. A relative change as indicated would be due therefore to a change in composition of the hydrocarbon mixture rather than to a change in the surface pressure and temperature. An increase in the ratio of light to heavy components in the mixture would shift the loop of Fig. 1 upward in pressure and downward in temperature, so that the surface pressure and temperature would be shifted relatively from PT to P'T'. In other words, atmospheric pressure and normal surface temperature may be close to the bubble-point line in one case or close to the dew-point line in another case. If the former, the reservoir mixture would be richer in heavier components and the produced oil would be of low A.P.I. gravity. If the latter, the mixture would be richer in lighter components and the produced liquid would be high in A.P.I. gravity.

This type of variation is illustrated in Fig. 2, which is a plot of data from the reference given to show a segment of the pressure-temperature diagram for different hydrocarbon mixtures. The investigators who reported these data determined the phase properties of various mixtures made by recombining a surface oil and gas in different gas-oil ratios. An increase in gas-oil ratio means that the ratio of light to heavy components has been increased. At the lowest ratio the bubble-point line is lowest on the pressure scale. As the ratio increases the bubble-point line lies at higher pressures. Thus the relative position of surface pressure and temperature within the two phase portion of the diagram has been changed.

As the hydrocarbon mixture becomes richer in lighter components, the critical temperature of the mixture is lowered. Therefore, the temperature at which these fluids would exist without becoming retrograde would decrease as they become richer in lighter components.

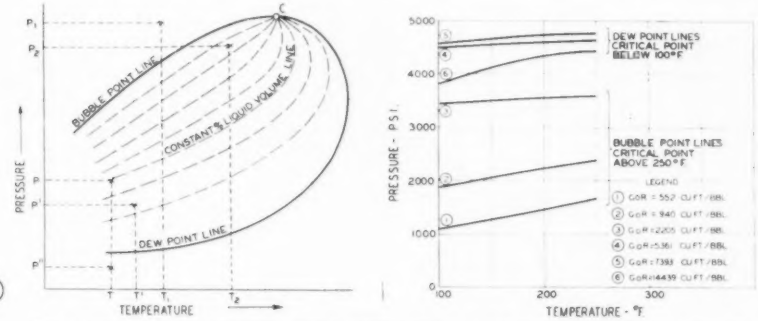
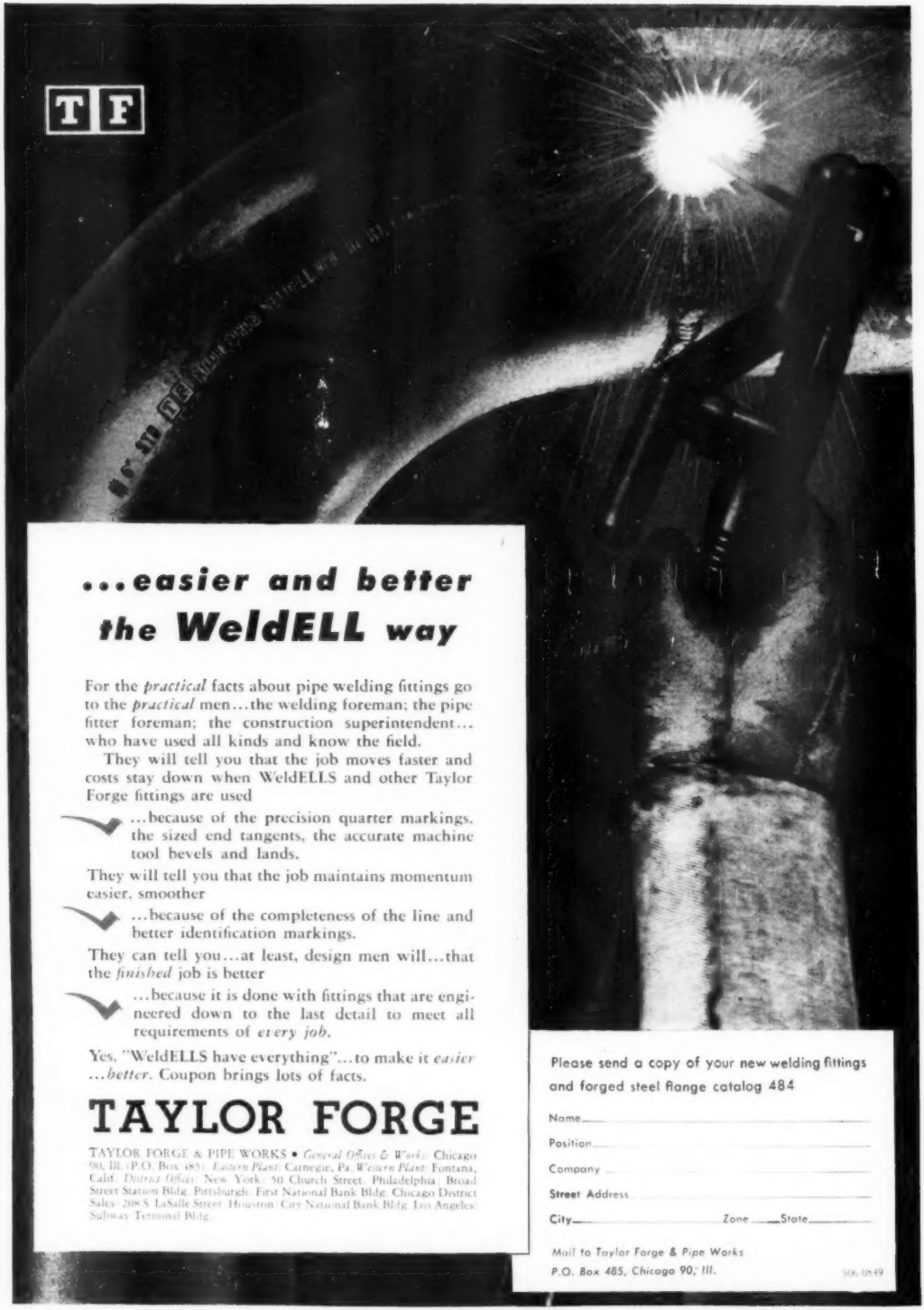


Fig. 1—(Left) Schematic diagram showing relative pressures and temperatures for reservoir with and without free gas. P_1T_1 = undersaturated crude. P_2T_2 = saturated crude. PT and P'T' are two different surface conditions. Fig. 2—(Right) Data showing relative pressure and temperature changes for different composition of reservoir fluids

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma



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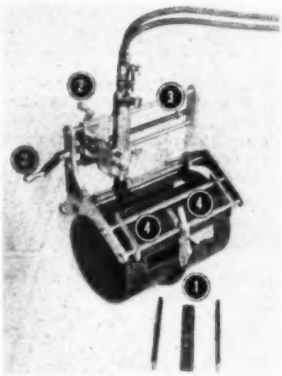
OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

by Dan B. Miller

(1) DOMOTOR VALVE. In construction the valve body is comprised of two simple castings. When bolted together with the seat ring serving as a bridge or separation unit, maximum strength and flexibility are provided. Clean, smooth flow passages without pockets or shoulders to accumulate solids contribute to increased flow capacity and makes the valve most suitable for handling erosive, corrosive, and viscous fluids which may be carrying solids. This valve body is unique in that the two body parts may be rotated about the seat ring in assembly to form a right-hand angle, left-hand angle, or a straight-through pattern. *Annin Co.*

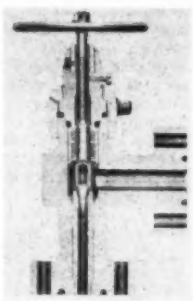
IT'S NEW ✓ CHECK IT



shown is attached to a pair of welding test nipples. The three coupons appear exactly as they were cut by the torch. Coupons (1) have smooth, straight, parallel sides, thus eliminating all machining. Coupons are cut by alternate operation of two cranks (2), causing the torch to travel at constant speed for a predetermined distance in each direction. Two stop nuts (3) on each screw are set for desired coupon length and width. *T. D. Williamson, Inc.*

IT'S NEW ✓ CHECK IT

(2) MODELS PC POSITIVE AND JW ADJUSTABLE CHOKES. Special design features of the new unit include a hand-tight flow cap and O-ring bonnet-seal unit, and an enclosed stem thread and scale indicator. Completely convertible, the body of the PC is designed to accommodate the JW adjustable choke bonnet and seating bean. Easy conversion of the choke permits the use of a JW for cleaning a well, with quick change to a PC for steady production. The choke's rugged, compact design permits it to be used under high working pressures. *Oil Center Tool Co.*



IT'S NEW ✓ CHECK IT

(3) PIPE-LINE COUPON CUTTER is a quick, handy device for cutting finished coupons. The coupon cutter

(4) CROSS-SECTION ROCK BIT features greater bearing area and stronger construction, enabling this bit to take greater drilling speed or weight. Increased circulation combined with wide-spaced, easily cleaned teeth overcome any tendencies to "ball up," with the result that the bit is always smooth running, and working on bottom. Cutters are large, which not only permits the use of big bearings, but gives more side-wall contact and keeps the hole cut to gage from the beginning of the run until the bit is pulled. Two types are available. The S-4C is for sticky formations, and the M-4C for harder digging. *Globe Oil Tools Co.*

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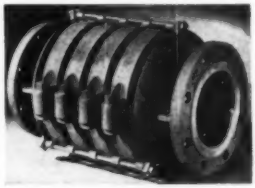
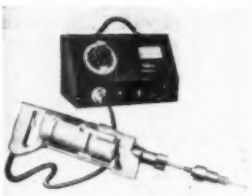
(5) CORRUFLEX PACKLESS EXPANSION JOINT requires no packing and is ideally suited for use in remote and difficult-to-service locations. More economical installations are possible since the compactness of this new joint permits its use in trenches, tunnels, or other cramped quarters. Available in sizes from 3 to 24-in., single or multiple corrugation, with or without self-equalizing rings, single or double units, and with either flanged or welding ends. It is supplied in copper, stainless steel, or other alloys, and with internal sleeves if required. Traverse ranges from fractions of an inch to 15 in. Will operate under pressures from vacuum to 300 lb. and temperatures from subzero to 1,600° F. *American District Steam Co.*



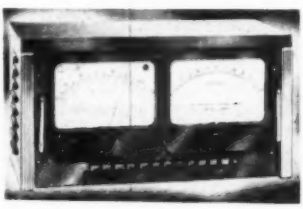
IT'S NEW CHECK IT

(6) ELECTRIC TUBE ROLLING CONTROL takes all the guesswork out of tube expanding. Because it eliminates the factor of human judgment all tubes in the unit can be rolled with uniform accuracy regardless of the experience of the operator. System consists of the control mechanism, operated with a dial calibrated for the known expansion peak of each type of metal; and electric expander driving motor; and either a G-800 or G-1200 ball-bearing type condenser and heat exchanger tube expander. When the maximum torque is reached, the control automatically cuts off the power, the motor reserves, and the operator may then withdraw the expander and go on to the next tube-end. *Airetool Manufacturing Co.*



IT'S NEW CHECK IT

(7) VAREC ELECTRONIC GAGER for the remote gaging of multiple tanks from a single location affords a low cost, convenient, and accurate means of taking tank gages without hazards. When used with a Varec automatic float-type tank gage, readings of Electronic gager are accurate to plus or minus 1/16 in. of tank level. Receivers are made in 10 and 24-tank, fingertip versions for selective gaging of any one tank or on-gage versions for the simultaneous gaging of all tanks. All styles may be had in explosionproof construction. *Vapor Recovery Systems Co.*



IT'S NEW CHECK IT

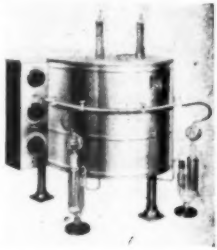
(8) UCON, new heat-transfer fluids with unusual resistance to sludging and coking are made from polyalkylene glycols and derivatives and differ chemically and in performance characteristics from petroleum oils, from the silicones, and from the synthetic oils developed in Germany during the war. Most valuable as heat-transfer liquids in a temperature range from 60° up to 500° F. They are characterized by low pour points and have little change in viscosity with temperature. They have a minimum effect on various types of rubber and packings. Both water-soluble and water-insoluble fluids are available in various viscosities. *Carbide & Carbon Chemicals Corp.*

IT'S NEW CHECK IT

(9) SOLID-WEDGE TYPE GAGE ILLUMINATORS give evenly diffused light over the entire length of the gage glass with no glare spots or blinding areas. Enables the engineer to see liquid level easily and clearly under all conditions. Illuminators incorporate the principle of solid-wedge lighting in combination with plastic, whereby the illumination from a single light source is reflected from an angular surface and flows with evenly diffused intensity through the transparent gage glass. Made in both explosionproof and standard models for all sizes of transparent gages and in both single and double section styles. *Jerguson Gage & Valve Co.*

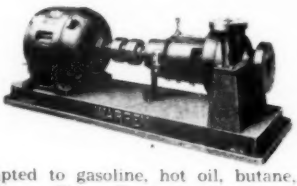
IT'S NEW CHECK IT

(10) VERTICAL-TUBE SULFUR-DETERMINATION APPARATUS was engineered to give a rapid method of sulfur determination for the petroleum industry. Multiple analysis of a variety of oils and other liquid organic compounds can be performed simultaneously. Each of the six vertical tubes is heated by a Ful-Kontrol heater which reaches temperatures as high as 1,525° F. Precise control of heat from 0 to 320 watts is realized with builtin autotransformers. Nickel chromium elements embedded in special refractories are protected by a steel-tube jacket. Tubing for connection to a vacuum line has six outlets with shutoff valves at each outlet. *Precision Scientific Co.*



IT'S NEW CHECK IT

(11) TYPE RL PUMP. A new line of process pumps handles hot oil and other liquids up to 800° F., capacities to 1,200 g.p.m., differential heads to 750 ft. Especially adapted to gasoline, hot oil, butane, propane, and acids. *Warren Steam Pump Co., Inc.*



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(12) ACME-PATTIN SINGLE WELL-PUMPING UNIT for depths up to 2,000 ft. features moderate speed, enclosed engine developing 7 hp. at 600 r.p.m. with adjustment for running on a variety of fuels. Polished rod con-

nects to steel walking beam with ⅝-in. wire line. Stroke is 18½ in. The complete assembly is mounted on channel-steel frame, ready for bolting to foundation. Weight complete is 2,000 lb. *Acme Fishing Tool Co.*

IT'S NEW CHECK IT

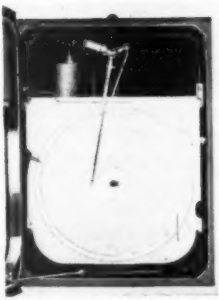
(13) NEW WELDING GOGGLE HAS NYLON CUPS. More strength and less weight are features of this new welding goggle with cups of DuPont nylon plastic. Features of the goggle include: rolled edges to reduce pressure around the eye socket; adjustable leather bridge and headband to assure perfect fit; exclusive triangular lenses for extra wide vision; and screened indirect ventilating ports which admit sufficient air to prevent fogging, but keep out dust and flying particles. *Willson Products, Inc.*

IT'S NEW CHECK IT

(14) DEAD-WEIGHT HYDRAULIC FILTER PRESS. A new simplified, dead-weight hydraulic pressure unit for use in determining the filtration characteristics of drilling mud attaches easily to the standard Baroid No. 300 filter press and eliminates the need for outside pressure sources. It is especially recommended for drilling operations in remote or overseas areas where compressed nitrogen is difficult to obtain. Delivers 100 psi. to the filter cell. The assembly is composed of a water reservoir, piston and cylinder, dead weight, delivery pressure gage, two check valves, and a bleedoff valve. *Baroid Sales Division.*

IT'S NEW CHECK IT

(15) SERIES 500 RECORDING ABSOLUTE PRESSURE GAGE based on a principle involving pressure-sealed lever arm, constructed so it is frictionless, entirely free from lost motion, and free of turning moments due to changes in differential pressure across it. This design makes possible the recording of extremely low absolute pressure ranges. The new instrument is offered in ranges from 0 to 20 mm. mercury up. It is rugged in construction and can be used under ordinary plant conditions. Instrument is offered as a recorder, as an automatic controller, and for remote measurement and automatic control of absolute pressure. *Bristol Co.*



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(16) HIGH-PRESSURE LUBRICATED SERVICE COCKS, for working pressures up to 125 lb. on gas, oil, or water lines. Available in ¾ and 1-in. sizes, the service cocks have cast-iron bodies and bronze plugs, and are made with both screwed recessed ends and Dresser superservice ends. The compact service cocks were designed to meet the need for a tamperproof service cock suitable for gas working pressures up to 125 lb. The devices also feature the advantages of the regular type of high-pressure lubricated plug valves, in that the plug is always held against its seat in the body by a gland through resilient packing. *Walworth Co.*

IT'S NEW CHECK IT

(17) EVERETT TRENCHING MACHINE. This trencher cuts clean trenches in soils of all types with its cast-steel digging buckets. It has adjustable clearance teeth and digs from 12 to 18 in. in width. This new trencher can be set to cut any distance down to 42 in. deep, and it travels from 1½ to 5 ft. a minute, depending upon the depth and width of cut and type of soil. The trencher has special transmission for necessary speed reduction. This can be switched to standard tractor speeds by shifting lever. It can travel over curbs and up inclines and maneuvers quickly into working position. *Tractor Sales Corp.*

IT'S NEW CHECK IT

(18) SAF-T-PLUG WRENCH will fit any size plug on any type of drum. Will service large filler or small drain plugs, compound or double-type plugs, and where seal cap rings are used, it is ideal. It is of one-piece construction, no moving parts, no adjustments to make. It is tapered at angle of operation to give plenty of hand clearance. Weighs 3 lb., is heat treated for strength, cadmium plated for style, and balanced for ease of handling. It has an 18-in. leverage. *Wm. C. Richards Co.*

IT'S NEW CHECK IT

(19) HIGH-PRESSURE SUMP PUMP for highly efficient and economical restoration of gasoline and lubricating oils to high-pressure transmission lines is designed to handle any pipe-line fluid. The pump requires no prime mover since it operates on a power differential principle, developing a high discharge pressure in direct ratio to low input pressure. Both exhaust and high-pressure dis-

charge are connected to the same line. Designed to operate in any position, it is particularly adaptable to installations requiring special mounting or where space is limited. Compact and portable, it is of noncorrosive construction, possessing the added safety feature of a completely automatic, nonsparking design. *McFarland Manufacturing Corp.*

IT'S NEW ✓ CHECK IT

TRADE LITERATURE

(20) COMPARISON CHART STAINLESS STEEL 2-IN. GATE VALVES. One of a series of detailed engineering comparison charts designed to assist in the selection of stainless-steel valves. *Cooper Alloy Foundry Co.*

(21) BANTAM PUMP. This bulletin covers Model 1½ AP pump and Model 2 PAF pump with capacities up to 5,700 gal. per hour. *Jaeger Machine Co.*

(22) PETROLEUM-TESTING APPARATUS. The new 104-page book contains test apparatus for asphalt, gas, gasoline, grease, and lubricants. In addition, a complete listing of petroleum testing utilities such as baths, combustion apparatus, distillation units, high-pressure equipment, samplers, and thermometers are included. *Precision Scientific Co.*

(23) DIRECT-FIRED AIR HEATER BULLETIN. Printed in four colors, this six-page bulletin is illustrated with flow charts in full color, cross-section drawings, typical applications and operating data that simplify the definition and understanding of direct-fired air heaters and clarify their application. *Peabody Engineering Corp.*

(24) FIRE-FIGHTING EQUIPMENT. A well-illustrated booklet with complete operating data covering fire hoses of all types, hydrant valves, couplings, and nozzles. Included also, is discussion on portable extinguishers and asbestos clothing. *George Angus & Co., Ltd.*

(25) STEEL MAKING IN AMERICA describes, in simple terms, the manufacture of steel in the United States from raw materials through finished steel products ready for shipment from the mills. A brief history of the iron and steel industry from earliest times to the present is also included. *United States Steel Corp.*

(26) OIL WELL PUMPING CONTROL. A new four-page folder describes Cutler-Hammer oil-well pumping control, designed for across-the-line starting of squirrel-cage motors. *Cutler-Hammer, Inc.*

(27) TURBINE PUMP FOR EVERY WATER-TRANSFER JOB is the theme of two interesting and well-illustrated booklets. Text deals with many applications for which pumps are designed, and explains how interchangeability of parts further extends their utility and economy. Sectional drawings show the component parts of the pumps. *Johnston Pump Co.*

(28) SIDE-ENTERING AGITATORS, a four-page brochure describes in detail the design, construction features, and application of these process units. *Industrial Process Engineers.*

(29) HEAT-REM, a new data sheet and application bulletin on high-heat-resisting aluminum paint. Heat-Rem is suitable for use on all interior or exterior hot surfaces subject to 1,000° to 1,500° F. It resists fumes, moisture, and acids. *Speco, Inc.*

(30) ARCCO BULLETIN NO. 111R. A new two-colored bulletin describing Arcco-Anubis liquid gravitometers explains in detail and illustrates with graphs and installation diagrams, both the standard instrument and the controlling recording liquid gravitometer for use in the petroleum industry. *American Recording Chart Co.*

(31) POCKET ENGINEER. Contains capacitor information. Rules of thumb for answering questions concerning capacitors and for applying power-factor-improvement are available in wallet-card size. *General Electric Co., Apparatus Department.*

(32) STOCK SPROCKET CATALOG. The enlarged line of various types of stock sprockets and of single and multiple-strand roller chains carried in stock by its distributor organization is described in the new 40-page catalog No. 709. *Diamond Chain Co., Inc.*

(33) ELECTRODES, WELDING SETS, ACCESSORIES. This pocket guide lists electrodes by name, description, properties, and applications for each electrode offered. Also carries a list of welding equipment, accessories, and stores and depots carrying these supplies. *Quasi-Arc Co., Ltd.*

(34) POSITIVE-SEAL BAFFLE for two shell-pass heat exchangers is a pamphlet describing a tight longitudinal baffle. Contains exploded view of linkage, steel backing strip, and packing which seal the baffle. *Henry Vogt Machine Co.*

(35) ENGINEERED FILTRATION is a six-page folder describing Auto-Klean, Flo-Klean, and Micro-Clean filters. The folder explains the principle of edge filtration, backwash filter cleaning, and the replacement element micronic filter. Sectional diagrams and capacity tables of each model are included. *Cuno Engineering Corp.*

(36) GALV-WELD. A four-page brochure illustrates and describes the function of this low-melting, zinc-base alloy that regalvanizes structures and sheets from which the galvanizing has been burned off during the welding process. *United States Steel Supply Co.*

(37) DESULFO PLANTS is a 12-page booklet describing a desulfurization plant which is installed at the well head and which requires no operating personnel. Capacity for sulfur removal is thoroughly discussed, and included in the process description is a schematic flow sheet of the plant. *Stacey Dresser Engineering.*

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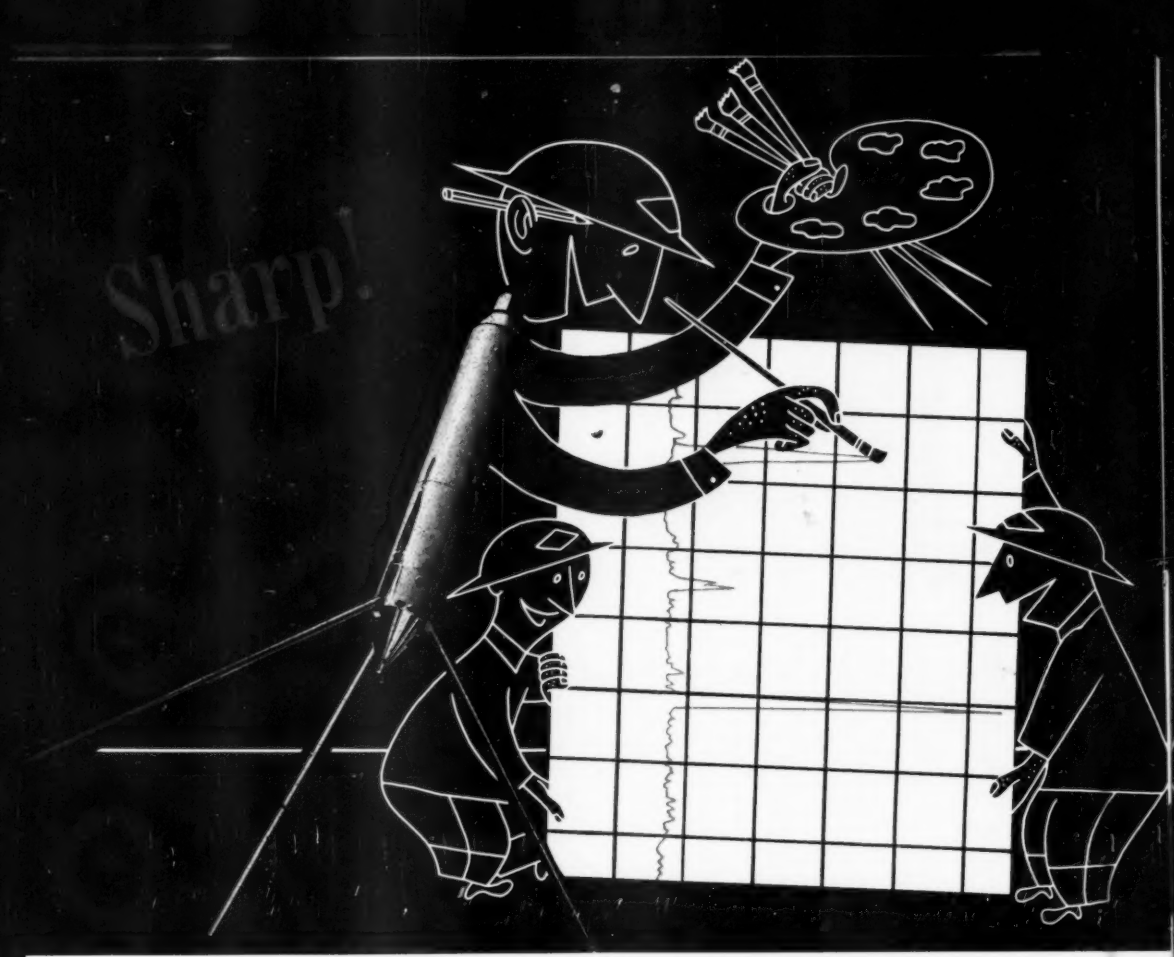

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Amount of Ethylene In Cracked Gases

We note your petrochemical ethylene production figures in The Oil and Gas Journal of June 23, 1949. How much of the ethylene contained in petroleum gases is being utilized for chemicals?—J. C. B.

The figures given in our Question on Technology answers of June 23, 1949, entitled, "Petrochemical Ethylene Production," are amounts of petroleum ethylene being utilized for chemicals. Some of this ethylene is separated or extracted from cracking-still gases but by far most of it comes from the thermal decomposition of ethane and propane.

The amount of ethylene available in cracked gases is enormous but the removal of ethylene from these somewhat dilute gases is expensive, particularly if the cracking plant is small. The new Hypersorption process by which ethylene can be adsorbed in a continuous manner by means of activated carbon promises to be an inexpensive method of recovering the ethylene from relatively small amounts of cracked gases.

Armistead (Ref. Nat. Gaso. Mfr., September 1941, page 67) is apparently the only authority that has ventured to state a quantity. For the year 1940, his estimate is 956,000,000 lb. The accuracy of any such estimate is directly dependent on (1) an estimate of the composition of the cracking-still gases, and (2) an estimate of the amount of gas produced in cracking. Data given in Table 78, page 361, of Petroleum Refinery Engineering, Third Edition (McGraw-Hill Book Co., Inc., New York, 1949) indicate average gas analyses and characteristics as shown in Table 1 here.

If the gases of Table 1 are truly representative then the total ethylene in cracked gases in recent years is as shown in Table 2. Note that ethane and propane are also included so that the reader can estimate the amount of ethylene possible from these gases if they should be converted into ethylene by decomposition. A weight per cent yield of 75 per cent of ethylene from mixed ethane and propane is reasonable.

TABLE 1—APPROXIMATE AVERAGE CRACKED GASES

	Mixed thermal gases	Dry catalytic gases
M.W.	27.8	26.9
Cu. ft. per bbl. of feed stock	430	330
Per cent:		
Ethylene	5.0	7.3
Ethane	22.2	9.2
Propane	18.7	21.7

Ductile Cast Iron Manufacturers

Where can we obtain the nodular cast iron mentioned by you on page 365 of The Oil and Gas Journal, May 19?—F. M.

According to International Nickel Co., foundries that are at present licensed to produce ductile cast iron are:

Albion Malleable Iron Co., Albion, Mich.
Anstice Co., Inc., Rochester, N. Y.
Benton Harbor Malleable Industries, Benton Harbor, Mich.
Bison Castings, Inc., Buffalo, N. Y.
Cooper-Bessemer Corp., Grove City, Pa.
Dostal-Per Mold Foundry Co., Pontiac, Mich.
Francis & Nygren Foundry Co., Chicago.
Kutztown Foundry & Machine Co. Kutztown, Pa.
Lynchburg Foundry Co., Radford, Va.
Noblesville Casting Co., Noblesville, Ind.
Pitz Foundry, Inc., Brooklyn, N. Y.
Ritter Company, Inc., Rochester, N. Y.
Straight Line Foundry & Machine Co., Syracuse, N. Y.
Texas Foundries, Inc., Lufkin, Tex.
Youngstown Foundry & Machine Co., Youngstown, Ohio.

In the short time that such irons have been available, most all of the development has been in the Northeast. Eight foundries are available in New York, Pennsylvania, and Virginia; six foundries are in Michigan, Indiana, Ohio, and Illinois; and only one is available in the Southwest (Texas).

TABLE 2—APPROXIMATE ETHYLENE, ETHANE AND PROPANE IN CRACKED GASES

	Approximate cracking capacity, bbl. per day feed stock			§ Million pounds per year		
	Catalytic	Thermal	Total	Ethylene	Ethane	Propane
1949 (March)	1,466,000	2,330,000	3,796,000	2,303	7,707	12,360
1948	1,350,000	2,402,000	3,752,000	2,272	7,795	12,250
1947	1,185,000	2,099,000	3,284,000	1,986	6,830	10,720
1946	1,100,000	2,154,000	3,254,000	1,960	6,885	10,650
1940		2,198,000	2,198,300	1,280	6,050	7,460

Heat Equivalent of Coal and Oil

In your February 24, 1949, issue, page 91, you used a footnote to a chart which reads, "0.229 ton of bituminous coal has a B.t.u. content equivalent to 1 bbl. of No. 6 fuel." Is this the figure of equivalency used in the United States?—J. A. B.

Although some agencies undoubtedly have adopted fixed values of heating values for accountancy purposes, we believe that no formal action has been taken on a nation-wide basis. In the petroleum industry it is common practice to consider the heating value (gross) of a barrel of fuel oil as 6,000,000 B.t.u. However, this is probably more a matter of convenience than of accuracy because the heating value of fuel oil ordinarily ranges from 6,300,000 to 6,400,000 B.t.u. per barrel. The heating value of bituminous coal varies, e.g., 7,700 to 14,800 B.t.u. per pound (as fired) depending upon the grade and upon the amount of ash. Pittsburgh bituminous coal is, however, more uniform—13,200-14,000 B.t.u. per pound and an average value often employed is 13,500.

Thus the equivalency factors can vary as follows:

Gross or higher heating value: B.t.u. per lb		B.t.u. per market unit		Factor, tons coal per bbl. oil
Oil	Coal	Oil (bbl.)	Coal (tons)	
17,800	8,000	6,400,000	16×10^6	0.400
17,800	12,500	6,400,000	25×10^6	0.256
17,800	13,500	6,400,000	27×10^6	0.237
17,800	14,500	6,400,000	29×10^6	0.220
18,300	8,000	6,300,000	16×10^6	0.394
18,300	12,500	6,300,000	26×10^6	0.252
18,300	13,500	6,300,000	27×10^6	0.234
18,300	14,500	6,300,000	29×10^6	0.218

This tabulation shows that a factor of 0.229 as used by D. M. Duff in The Oil and Gas Journal is a good average value. From a practical standpoint the net heating value is a more useful figure than the gross heating value. However, the use of net heating values scarcely changes the equivalency factor, reducing it by about 2 per cent. For a factor that is to be used for rule-of-thumb purposes or for mental estimates, an equivalency factor of 0.25 might be useful, i.e., 4 bbl. of oil are the equivalent of 1 ton bituminous coal.

Heating values on various coals are published in Kent's Mechanical Engineers Handbook, Power, eleventh edition (John Wiley & Sons, New York, 1936) and on oils, Petroleum Refinery Engineering, third edition, pages 169 and 360 (McGraw-Hill Book Co., New York, 1949). Finally, a complete tabulation of the equivalency factors of all types of fuels is published in The Refiner's Notebook No. 114, entitled, "Equivalent Heating Value of Refinery Fuels" *(The Oil and Gas Journal, October 12, 1946, pages 111, 112)*.

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PIPE LINES

Salt Lake System Lets Product-Line Contracts

Salt Lake Pipe Line Co., a wholly owned subsidiary of Standard Oil Co. of California, has awarded contracts for laying 320 miles of 8-in. products line from Salt Lake City to Boise, Idaho, which will be the first step in building the 560-mile products line to extend eventually to the Columbia River area in the vicinity of Pasco, Wash.

Contracts have been awarded as follows: Smith Contracting Co. will lay the section between Salt Lake City and Burley, Idaho; Oklahoma Contracting Co. and Grafe-Callahan Contracting Co. will build the Burley-Boise, Idaho, section.

Tennessee Gas Transmission To Build Buffalo Line

Federal Power Commission has authorized Tennessee Gas Transmission Co. to carry out a $90,000,000 expansion program which will increase capacity of the company's pipe-line system to more than a billion cubic feet per day and extend its main pipe line from northeastern Kentucky to the vicinity of Buffalo.

The program as now authorized by the commission, in addition to portions previously approved, involves construction of approximately 450 miles of additional main-line loops along the company's system; a 395-mile 26-in. new main pipe line extending from northeastern Kentucky through Ohio and western Pennsylvania to a point south of Buffalo; an aggregate of 325 miles of lateral lines; and additional compressor units aggregating 79,800 hp.

Hearings on the Tennessee plan originally were held last summer. FPC, however, subsequently reopened the proceeding for further showing, among other things, of the adequacy of Tennessee's gas supply. At the company's request further hearings were held last fall on certain phases of the proceeding, and in December 1948 the commission authorized the firm to construct a portion of the proposed facilities, including approximately 516 miles of main-line loops, 85 miles of lateral line, and additional 27,200 hp. of compressor facilities. These facilities were authorized for the specific purpose of transporting 111,000,000 cu. ft. of gas per day for the account of Manufacturers Light & Heat Co., Pittsburgh.

On May 3, 1949, FPC authorized Tennessee to construct another portion of the proposed facilities, including 155 miles of 30-in. loop lines and 4,200 hp. additional at compressor stations, in this instance for the purpose of transporting 60,000,000 cu. ft. of natural gas per day to East Tennessee Natural Gas Co. for ultimate delivery to the atomic energy plant at Oak Ridge, Tenn.

Utility companies to receive gas from the new facilities include United Gas Fuel Co. (Columbia); East Ohio Gas Co., Hope Natural Gas Co., and Peoples Natural Gas Co. (Consolidated); Iriquois Gas Corp., Pennsylvania Gas Co., and United Natural Gas Co. (National Fuel); and Equitable Gas Co. Construction is to start not later than January 1, 1952.

The commission dismissed without prejudice Tennessee's proposal to extend its system from Buffalo to Boston.

Shell Prepares for Elk City, Okla., Outlet

Plans for a 160-mile, 10-in. pipe line to extend from the Elk City oil field in Beckham County, Oklahoma, to Cushing, Okla., were announced by T. E. Swigart, president, Shell Pipe Line Corp.

The new pipe line will have an initial capacity of 24,000 bbl. per day. With construction of intermediate pump stations, as oil production increases, the line will have an ultimate capacity of 50,000 bbl. per day. At Cushing the new project will tie in with the now-completed 1,000-mile big-inch Basin-Ozark Pipe Line Systems.

Swigart stated that the Basin-Ozark line replaces one of Shell Pipe Line's existing 10-in. lines from Cushing to Wood River, thus making it possible to utilize reconditioned pipe from the latter line in the construction of the new Elk City-Cushing project.

Arkansas Louisiana Seeks Carthage Outlet

Arkansas Louisiana Gas Co.'s application for authorization to construct additional natural-gas facilities, including about 163 miles of 20-in. pipe line, in Texas, Arkansas, and Louisiana will be considered at a Federal Power Commission hearing commencing August 15.

The company is proposing to build a 72-mile line with a capacity of 200,000,000 cu. ft. a day extending from Harrison County, Texas, to

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Columbia County, Arkansas, and approximately 90.8 miles of line between Columbia County and Perla, Ark. The latter line would have a daily delivery capacity of 140 million cubic feet, the company said.

Commonwealth Planning 200-Mile Virginia Line

Commonwealth Natural Gas Corp., Lynchburg, Va., has filed an amended application with Federal Power Commission seeking permit to construct a 200-mile pipe line in Virginia.

The line, to cost an estimated $5,041,900, would extend from a point of connection with Virginia Gas Transmission Corp.'s pipe line, probably in Green County, Virginia, to the vicinity of Norfolk. The company proposes to purchase its entire supply of natural gas from Virginia Gas Transmission.

Commonwealth listed its prospective customers as Petersburg & Hopewell Gas Co., Virginia Electric & Power Co., Portsmouth Gas Co., Suffolk Gas Co., and the cities of Richmond and Charlottesville, all of which now distribute manufactured gas. The firm also plans to serve the Solvay Process Division, Allied Chemical & Dye Corp., in Hopewell, Va. The project would be financed through sale of securities.

Another application to construct a similar pipe-line is now on file with FPC. Filed by Virginia Natural Gas Co., the application outlines plans to serve substantially the same area of Virginia, with the exception of Charlottesville and the Allied Chemical plant *(The Oil and Gas Journal, July 28, 1949, page 397)*.

Lake Shore Line Planned for Ohio

Lake Shore Pipe Line Co., Cleveland, has asked Federal Power Commission to authorize construction of 45 miles of pipe line in western Pennsylvania and northern Ohio to transport natural gas to Lake Shore Gas Co., Lake County Gas Co., and the City of Painesville for distribution in Ashtabula and Lake counties, Ohio. Estimated cost of the construction is $1,024,540.

Lake Shore Pipe Line Co. said it would purchase gas from Tennessee Gas Transmission Co. at a point near Meadville, Pa., for transportation over the proposed 45-mile line to Ashtabula. Tennessee's application for FPC authorization to construct a Kentucky-Buffalo pipe line is now before the commission for final decision.

Lake Shore Pipe Line Co. also proposes to purchase 27 miles of pipe line between Ashtabula and Fairport, Ohio, from Lake Shore Gas Co.

Another application, filed by Erie Gas Service Co., Inc., involving a similar pipe-line project to serve this

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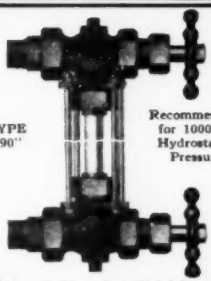

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same Ohio area is now pending before FPC. This application also calls for Tennessee to supply the gas from its proposed Kentucky-Buffalo line at a connection near Meadville, Pa.

Beaumont 26-Mile Line Planned by United

United Gas Pipe Line Co. has asked Federal Power Commission to authorize construction of a 26-mile pipe-line project with a capacity of 112,000,000 cu. ft. of natural gas per day which would connect four gas fields in southwestern Louisiana with the company's system in eastern Texas.

The company said the additional gas would be made available to the Beaumont-Port Arthur area. According to the application there is at present no outlet for the gas produced in the four fields, which have an estimated total proven natural-gas reserve of approximately 339,000,000,000 cu. ft. United Gas said it has entered into a contract to purchase gas from Magnolia Petroleum Co. The company estimates cost at $1,792,000.

Kansas-Nebraska Will Expand Pipe-Line System

Federal Power Commission has authorized Kansas-Nebraska Natural Gas Co., Inc., of Phillipsburg, Kans., to construct additional natural-gas transmission facilities which will increase the capacity of the company's system to 140,000,000 cu. ft. of gas per day. Estimated cost of the construction is $2,339,457.

The company was authorized to construct approximately 301 miles of main, lateral, and loop pipe lines, and to install new gas compressors with a total of 3,600 hp. in existing compressor stations.

The firm said the facilities are needed to meet increased demands of its present markets, and to provide service to the following Nebraska towns: Hazard, Ravenna, Rockville, Boelus, Dannebrog, St. Paul, Burwell, Ord, Sargent, Comstock, Arcadia, North Loup, and Scotia.

Humble Granted Permit For Laying 18-In. Line

A permit to build an 18-in. oil pipe line across Gillespie County, Texas, has been granted Humble interests by the county commissioners' court.

Tentative plans call for the line to be constructed across the northern and eastern parts of the county. It would be built from West Texas oil fields to the Houston area, according to reports.

Humble Pipe Line Co. is reported to have been considering plans for construction of a 370-mile crude-oil line from West Texas to Satsuma and Baytown, Tex.

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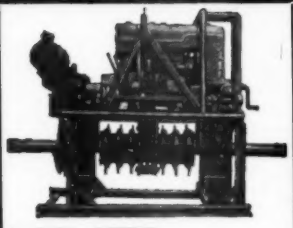

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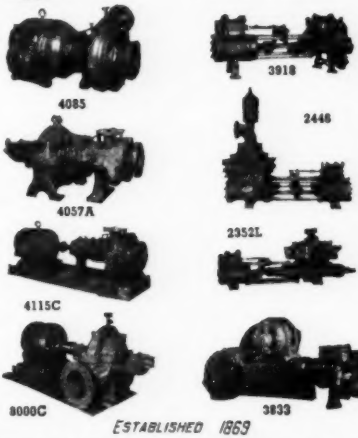

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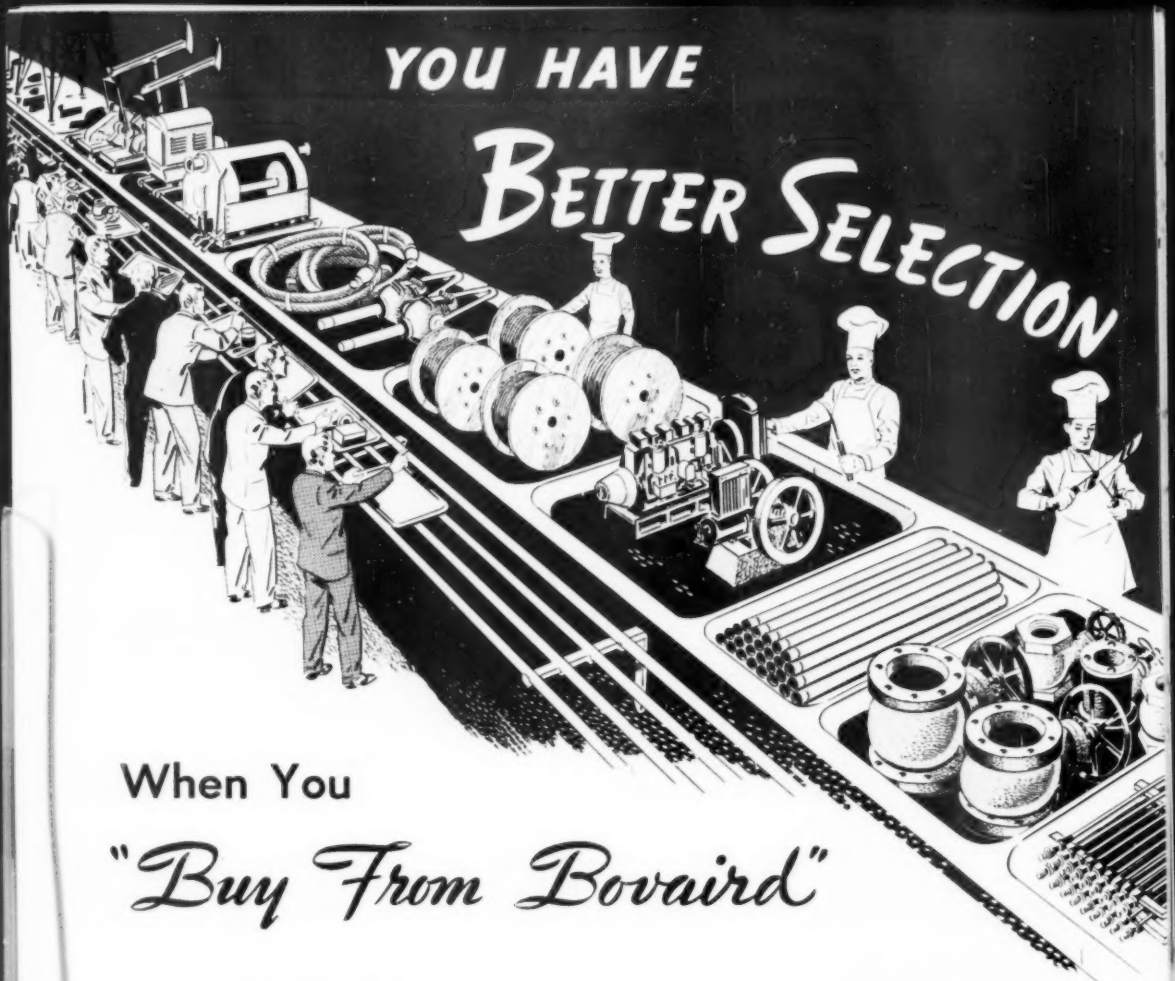

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Additional Decline Shown In Operating Drilling Rigs

The number of rotary rigs operating in the United States and western Canada declined sharply during the week ended July 25, due primarily to a substantial slackening of activity in the Pacific Coast, Gulf Coast, and Illinois basin areas. Over-all, there were 27 fewer rigs reported operating than in the previous week, and 283 fewer than at the same time a year ago. The number is 170 below the peak for this year.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area	Week ended 7-25-49	Change week ended 7-18-49	Change week ended 7-26-48
Gulf Coast	511	—12	—66
W. Tex.-New Mex.	516	+ 5	—83
Ark.-N. La.-E. Tex.	165	+ 6	0
Oklahoma	226	+ 4	—60
Kansas	119	— 3	— 5
Illinois-Eastern	117	—11	+ 1
Pacific Coast	157	—21	—28
Rocky Mountains	114	+ 2	—55
Total U. S.	1,925	—30	—305
Western Canada	72	+ 3	+ 22
Total	1,977	—27	—283

*Courtesy Hughes Tool Co.

New Contracting Company

Howard H. Davis and William J. Van Aken have organized the Continental Drilling Co. to engage in contract drilling in the Tri-State area of Illinois, Indiana, and Western Kentucky. The former is president and the latter treasurer. Headquarters are at Evansville, Ind.

Steen Drilling Co., Houston, has contracted with Gulf Refining Co. to drill its 2 Krause & Managan at Edgerly, in Calcasieu Parish, Coastal Louisiana. Projected depth of the test is 10,000 ft.

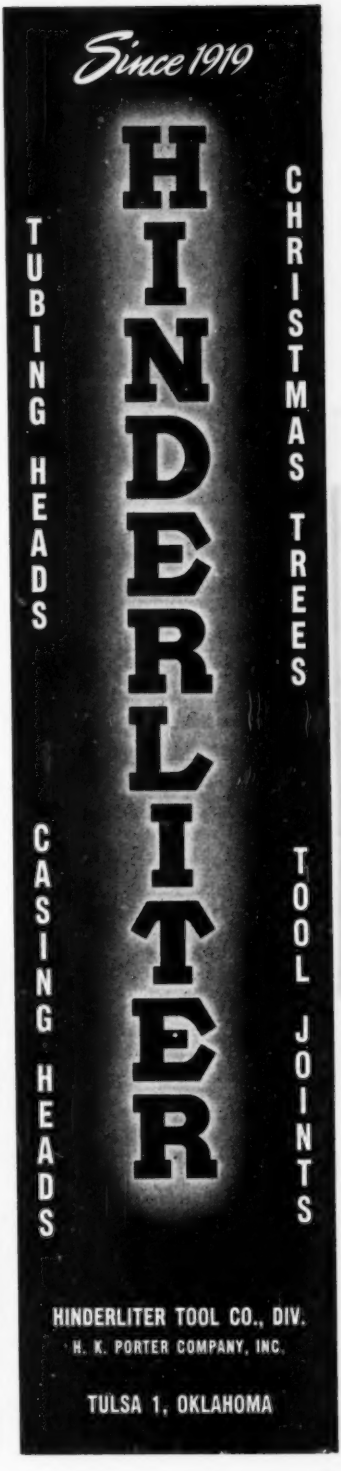
T. M. Pruett Drilling Co., Centralia, Ill., has the contract for Carrol & Ryan-1 Floyd Thomas, a semiwildcat in the Iva area, in 35-1n-7w, Pike County, Indiana.

Bankhead Drilling Co., Baton Rouge, is drilling an 8,500-ft. well for A. J. Bankhead and associates on the Rolston Community Unit in the University field at Baton Rouge. East Baton Rouge Parish.

Roeser & Pendleton, Fort Worth, have contracted with Sohio Petroleum Co. to drill a 12,000-ft. wildcat test on the Theall prospect in Vermilion Parish, Coastal Louisiana. Location is on the Sevignier Hebert lease in 6-14s-3e.

Fred M. Manning, Inc., Denver, as contractor and joint operator with Pacific Petroleum, Ltd., is moving in a rotary rig to drill a 4,800-ft. Devonian test in the Fort Augustus area, 11

Day-tour crew on Prime Drilling Co.'s rotary rig operating in the Fairport pool, Ellis County, Kansas. Left to right: Fred Harzman, tool pusher and driller; Jim Curtis, derrick man; Bud Harzman, pipe racker; and Tom Short, backup man. Currently, the rig is working for Solar Oil Corp.



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miles northeast of Edmonton, in central Alberta Province, Canada. The location, in LSD 13, 6-55n-22w4th, is 15 miles southwest of the prolific Redwater field.

Longhorn Drilling Corp., Three Rivers, Tex., has started a 6,500-ft. contract well for Western Natural Gas Co. on the St. Charles ranch, Aransas County School Land Survey, Aransas County, Texas Gulf Coast. Murray Coquat is drilling superintendent for the company.

Thomas P. Pike Drilling Co., Los Angeles, has started drilling on two new contracts in the Signal Hill field, one for Stanton Oil Co. at its 4 Hilton and the other for Max Pray at his 1 Dabney estate. The former well is scheduled to go to 6,600 ft. The latter is a 10,000 to 11,000-ft. test. Les Crabtree is pusher on the first, while Les Mondotte is pusher on the other. Pike is drilling another 10,000-ft. test at Montalvo for Standard Oil Co. with Ralph Smith as pusher. A 7,000 to 7,500-ft. well is being started for Standard Oil Co. on Elk Hills Naval Reserve with Verne Coates as pusher.

Camay Drilling Co., Los Angeles, is the contractor for Richfield Oil Corp. on the latter's 88-23 Schlaudeman, now drilling in the Cuyama Valley field.

E. F. Moran, Inc., Tulsa, has the contract for a 2,600-ft. Cypress sand test to be drilled for Rush Creek Oil Co. in 25-5s-14w, Posey County, Indiana. Location is southwest of the South Springfield pool.

Zephyr Drilling Co., Tulsa, has the contract and is joint operator with C. C. Cummings in the drilling of a 3,300-ft. wildcat test on the latter's Patton lease in 10-14n-8e, Creek County, Oklahoma.

Lohmann & Johnson Drilling Co., Evansville, Ind., has contracted with Alston B. Barron to deepen an old hole and also drill a new test on the latter's Strack lease in 29-6s-13w, north of the Mt. Vernon pool in Posey County, Indiana. Both tests are to be carried to the Cypress sand around 2,600 ft.

Henson Drilling Co., Flora, Ill., is starting a McClosky lime test for its own account in the Olney area, Richland County, Illinois. Location is in 9-3n-10e, on the Coen land.

Altus Drilling Co., Oklahoma City, is the contractor and joint operator with Russell Maguire on an exploratory well being started a mile north of the Jones pool in Oklahoma County, Oklahoma. The test, 1 Bednar, in the NE cor. 24-13n-1e, is projected to the Cleveland sand, expected around 4,950 ft.

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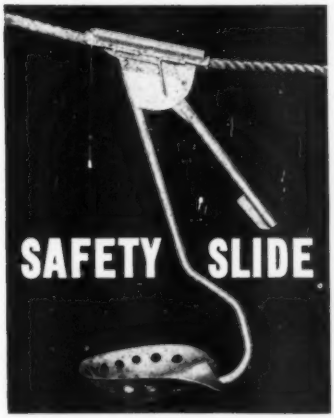

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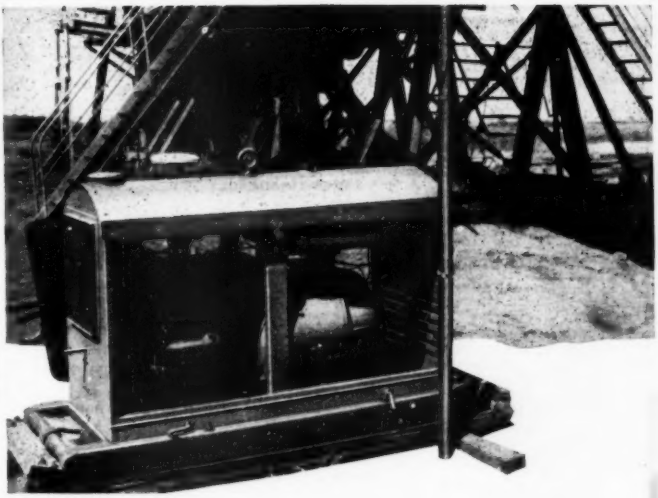

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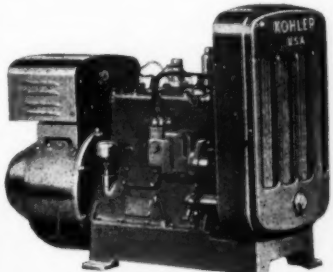

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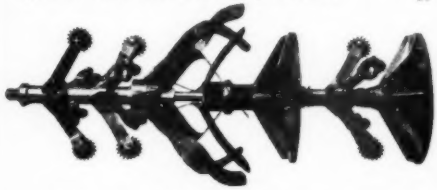

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REFINING

Great Lakes Project to Benefit 16 Refineries

SIXTEEN refineries, all of them in Kansas and Oklahoma, will benefit from the $55,000,000 project planned by Great Lakes Pipe Line Co. to double the capacity of its products system *(The Oil and Gas Journal, July 28, page 173)*.

The refineries, owned by 15 companies, had in aggregate a crude-oil distillation capacity at the beginning of this year of 274,000 bbl. daily.

Based on an over-all yield pattern as established by 1948 operations, estimates show a total gasoline production of about 138,000 bbl. daily. On the same basis, kerosine yields are estimated at 14,500 bbl. per day and the various distillate products, 49,000 bbl.

Expansion of crude-oil distillation capacity now is under way at three of the 16 refineries. Completion of this work, which involves approximately 40,000 bbl. per day, is expected during 1950, according to present schedules.

Approximately 50 per cent of this additional capacity is expected to be in operation before the end of this year and the remaining 20,000 bbl. per day is set for operation next year.

Most of the other refinery-building projects now in various stages of construction in a number of the 16 refineries involve principally modernization programs which will result in improved products rather than large capacity increases.

On a basis of weighted average yields for current operations in Oklahoma and Kansas refineries, increased production of the 16 refineries connected to the Great Lakes system is estimated to total 226,500 bbl. daily of gasolines, kerosine, and various distillates when the additional crude-oil capacity is in operation. A breakdown of this increased 1950-51 daily production figure shows gasolines at 154,300 bbl., kerosine 16,200 bbl., and distillate products 56,000 bbl.

REFINERIES SERVED BY THE GREAT LAKES PRODUCTS LINE SYSTEM

Company and location	Current crude oil cap., bbl. per day
Cities Service Oil Co. (Del.), Ponca City, Okla.	13,000
Cooperative Refinery Association, Coffeyville, Kans.	16,000
Continental Oil Co., Ponca City, Okla.	*33,000
Deep Rock Oil Corp., Cushing Okla.	12,000
El Dorado Refining Co., El Dorado, Kans.	8,500
Johnson Oil Refining Co., Cushing, Okla.	6,000
Kanotex Refining Co., Arkansas City, Kans.	8,500
Mid-Continent Petroleum Corp., West Tulsa, Okla.	45,000
Midland Cooperative Wholesale, Cushing, Okla.	6,500
Phillips Petroleum Co., Kansas City, Kans.	38,000
Skelly Oil Co., El Dorado, Kans.	†25,000
Sunray Oil Corp.:	
Allen, Okla.	5,000
Duncan, Okla.	20,000
The Texas Co., West Tulsa, Okla.	†21,000
Tide Water Associated Oil Co., Drumright, Okla.	12,000
Wilcox Oil Co., Bristow, Okla	5,000
Total	274,500

*19,000 bbl. additional capacity now under construction. †10,000 bbl. additional capacity now under construction.

Union to Let Contracts For Refinery Expansion

Union Oil Co. of California will begin letting contracts within 30 days for a 2-year, $40,000,000 refinery-expansion program. The company last week announced plans for a new $5,000,000 research plant to be built near Brea, Calif. *(The Oil and Gas Journal, July 28, 1949, page 343)*.

Purpose of the new facilities is to aid the company in providing an answer to the over-supply of heavy fuel oils. The new plants will make the heavier part of crude oil into more saleable products, such as coke.

Location of a new coke plant has not been determined but it is reported it will be either at Los Angeles or Santa Maria, Calif.

It is reported that several other California refiners are studying programs to restore heavy-oil balance.

First Continuous Shale-Oil Refinery Now in Operation

The nation's first continuous shale-oil refinery, near Rifle, Colo., has been completed and is now on stream.

Director James Boyd, U. S. Bureau of Mines, in reporting that the new 200-bbl. experimental unit was put on stream "without difficulty," said the plant is a highly flexible continuous unit designed to produce gasoline, diesel fuel, heating fuels, and fuel gas from crude-shale oils extracted at the bureau's oil-shale demonstration plant. It was built by Refinery Engineering Co., Tulsa, at a cost of $244,912.

Boyd stated that commercial uti-

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lization of the country's vast oil-shale resources is a three-fold problem: mining the shale, retorting the shale to produce oil, and refining the crude oil into useful products.

Crown Central's Refinery At Pasadena Still Closed

HOUSTON.—Crown Central Petroleum Corp.'s refinery at Pasadena, Tex., was still closed last week, due to labor difficulties. The plant shut down after the company charged employes were taking too much time to write out grievances *(The Oil and Gas Journal, July 14, 1949, page 116)*.

Company spokesmen reported that the plant would open as soon as the firm could meet with the local Oil Workers International Union (C.I.O.) and negotiate an agreement. No such meeting has been scheduled, however.

Meanwhile, both Crown Central and the union have filed charges with National Labor Relations Board charging unfair labor practices.

California Refining to Expand Eastern Plant

California Refining Co., eastern affiliate of Standard Oil Co. of California, is unofficially reported planning to double the crude-processing capacity of its 25,000-bbl. refinery located at Perth Amboy, N. J. An estimated $25,000,000 to $30,000,000 may be expended in completely modernizing the plant over the next several years.

Acquired from Barber Asphalt Co. in 1946, the plant has been gradually expanded in capacity by revamping existing equipment and gradually modernizing operations. The original Barber plant was rated at 10,000 bbl. capacity and included skimming, thermal cracking, and asphalt facilities.

The refinery is presently operating at capacity on crudes from the Gulf Coast and Venezuela. Although no official announcement of expansion plans have been made, it is understood that the modernization program may include catalytic cracking, as well as other recent refining techniques.

General Petroleum to Add To Delayed-Coking Unit

A third derrick will be added to the two derricks now operating at the delayed-coking unit of General Petroleum Corp.'s Torrance, Calif., refinery which will increase the unit's capacity by more than 50 per cent. Cost of the expansion project, which will add two more coker drums, has been set at $2,250,000 by the company.

The unit will turn more surplus heavy fuel oil into other petroleum products, which are in greater demand.

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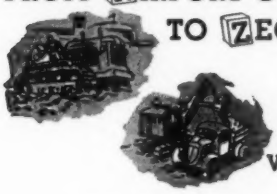

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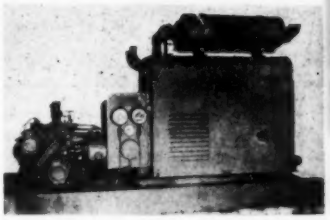

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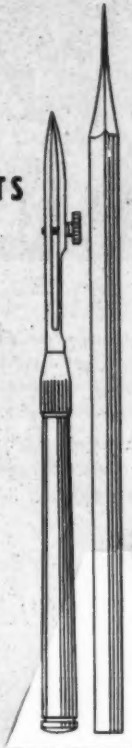

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NATURAL GAS

Construction Approved for Chicago Gas-Storage Plant

Federal Power Commission has given approval to Chicago District Pipeline Co.'s proposal to construct a $6,000,000 plant near Chicago for storing natural gas in liquid form during warm-weather months, for use in the area during peak winter demand *(The Oil and Gas Journal, June 9, 1949, page 110)*.

Estimated cost of the project was set by the company at $6,000,000. The plant will have a storage capacity of 400,000,000 cu. ft. of gas and contain facilities for liquefying approximately 4,000,000 cu. ft. of gas daily and for regasification and return to the transmission system of 6,000,000 cu. ft. hourly.

Atlantic Seaboard Corp. Given Gas-Sale Permit

Atlantic Seaboard Corp., member of Columbia Gas System, has been given Federal Power Commission authority to sell up to 70,000,000 cu. ft. of natural gas daily to Consolidated Gas Electric Light & Power Co., Baltimore, and to construct necessary metering and regulation facilities.

The proposal contemplates that sales to the Baltimore firm will begin in May 1950 and will involve volumes up to 30,000,000 cu. ft. daily for a period of 5 months; up to 55,000,000 cu. ft. daily for the next 13 months; and up to 70,000,000 cu. ft. daily thereafter. FPC ordered Atlantic to complete construction of the necessary metering and regulating facilities, estimated to cost $255,000, not later than May 1.

Chavez Indicates He May Oppose Natural-Gas Line

Unless his state is guaranteed a share of the natural gas, Sen. Dennis Chavez of New Mexico indicated he will oppose a proposed gas line to serve California and Arizona.

The senator said he would have no objection to El Paso Natural Gas Co.'s application to Federal Power Commission to build the line if the firm would earmark a portion of the gas for use in his state.

"New Mexico must have ample protection for her resources," Chavez said. "She must have a right to enough gas to meet future needs of industrialization and atomic-energy developments."

He proposed that FPC insist that El Paso agree to set aside a reserve of natural gas to be consumed only in New Mexico.

Gas-Treating Unit to Be Completed in September

Completion of a new gas-treating unit now being constructed in Vincennes, Ind., for Hoosier Gas Corp. is scheduled for September. It is designed for a throughput of 3,000,000 cu. ft. of gas daily and will operate to reduce hydrogen sulfide content of the gas to 1 grain per 100 cu. ft.

The plant incorporates a Stacy-Dresser Desulfo unit, and engineering is by Stacy-Dresser group.

Natural Gasoline

Construction Progressing On Benedum Gasoline Plant

Construction is progressing on a natural-gasoline plant in the Benedum field in Upton and Reagan counties, Texas, John T. Oxley, president of Texas Natural Gasoline Corp., Tulsa, announced. The plant will have a capacity of 55,000,000 cu. ft. of gas daily and is being constructed jointly by Texas Natural and Slick-Urschel Oil Co. Completion is scheduled this fall.

The plant, being constructed in the center of the field which was discovered by Slick-Urschel, will not include a steam-generating plant and is unusual in one respect in that the conventional type of deethanizer has been eliminated. Texas Natural will operate the plant and will market natural gasoline, isopentane, butane, isobutane and propane.

Erection of the plant will necessitate installation of more than 3,000 hp. in compressors, and 1,000 kw. in generator units. A treating plant is also being constructed to remove hydrogen sulfide from the gas. Residue will be sold to El Paso Natural Gas Co.

Todd Ranch Gasoline Plant To Be Ready in September

DALLAS. — The $3,000,000 Todd Ranch gasoline plant, 27 miles south of Big Lake in Crockett County, West Texas, on which construction was started in January of this year, is expected to be in operation in September.

The plant's 10,000,000 cu. ft. daily processing capacity is to be supplied from approximately 100 producing wells in Todd field, and piped to the plant through 18 miles of pipe line. A parallel pipe line will return residue gas to the various field units. Gathering and residue-system lines were contracted to George Tucker of Odessa.

Approximately 50,000 gal. of propane, butane, and natural gasoline will be manufactured daily and piped to Big Lake, where storage facilities and a six-car loading dock are under construction.

Two 4-in. pipe lines, each 27 miles in length, will carry the commercial products to Big Lake; one line for propane and butane and the other for natural gasoline. The two lines, now nearing completion, have been laid in a single ditch. Laying of the lines was subcontracted to Longview Equipment Co., Longview, Tex.

Eighteen storage tanks of 50,000 gal. capacity each are being installed. Ten of the tanks will be at the Todd Ranch plant and eight at Big Lake, adjacent to the loading racks, giving a total storage capacity at the plant of 500,000 gal., and 400,000 gal. at Big Lake.

A total of 20 permanent employes are to be housed at the camp site, which comprises 15 houses.

Cooling water for the plant will be furnished by six 600-ft. wells, producing 150 gal. per minute. A zeolite-type treating plant has been installed.

Facilities at the plant include three 190-kw. generators for power, and three 600-hp. compressors for the manufacture of commercial products.

The plant will be operated by Continental Oil Co., with Roy J. Schumann as superintendent for Continental.

$1,000,000 Gasoline Plant Is Slated for South Texas

Continental Oil Co., Sunray Oil Corp., et al, will construct a natural-gasoline plant with capacity of 12,000,000 cu. ft. daily at a cost of approximately $1,000,000 near Nordheim, 18 miles northeast of Kenedy in De Witt County, South Texas.

Plans include construction of a complete gas-gathering system and installation of four 600-hp. compressor units. Work is expected to be completed by the end of the year.

The plant will be erected in the interest of conserving gas and to provide a more efficient method of developing the Slick-Wilcox field. It is anticipated that approximately one-half of the natural gas handled by the plant will be returned to producing formations, and that the remainder will be sold.

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Exploration and Drilling

Exploration Activity in Last Half of 1949

LAST week in our Midyear Report, we reported on the industry's drilling plans for the last half of this year. *(See The Oil and Gas Journal, July 28, 1949, pages 186 to 188).* There are some points in that mass of statistics that are worth thinking about.

The first thing is the prospects for 1949 wildcat drilling now, as compared to last January. Well, last January the industry laid plans to drill 7,050 wildcats in 1949. When we tally up what they actually drilled in the first 6 months, plus what the revised plans are for the last 6 months, where do we wind up? With 6,990 wildcats. In other words, all the cutbacks in production allowables, and all the pessimistic rumors haven't shifted the wildcat drilling program as much as 1 per cent from what it was last January.

Furthermore, this 6,990 total will be slightly in excess of 1948's all-time record of 6,877 wildcats, and far above 1947's 5,461 tests.

There is only one interpretation of this possible. The collective opinion of thousands of oil men is that we are going to need more and more reserves to maintain the increased production they confidently expect to market at a profit over the next few years. That collective opinion is being backed with cold hard cash — and when men back their opinions with cash, you know they really believe in them.

Analyzing the shift between majors and independents in wildcatting activity, you come up with a seeming contradiction in ideas about future trends. The majors as a whole revised their 1949 wildcatting program downward between January and July, from 1,381 tests for the year to 1,065. The independents stepped their plans up between January and July from 5,672 to 5,925.

You can hear a lot of explanations about what is going on. One idea that might have some merit is this one. The majors, with a tremendous expansion in pipe line, refining, and marketing facilities requiring cash, cut back their own wildcat drilling just temporarily, because of tightness in the cash budget, when allowables were reduced. The explanation goes on that the independents, as a group, not being burdened with capital expansion requirements in other branches, have moved ahead with their wildcatting plans.

There is at least this much to support that interpretation. Complaints are just as long and loud as ever that you can't get a good farmout deal from most of the majors. Naturally there is always a difference of opinion on whether the terms of any farmout deal are good or poor. Bargaining is to be expected. But—if the majors, as a group, intended to continue this cutback in wildcatting over next year, then the terms for farmouts ought to be getting more favorable for the independent who wants to take a shot at testing some prospect held by the major company.

After all, one of the main reasons for the existence of a farmout market is the holding of more prospects with short-term leases than a major can include in its current budget. If the majors' cutback policy on wildcat drilling is to extend into next year, and perhaps beyond, then the supply of farmout prospects ought to be climbing higher and higher. One should be hearing of more and more unusually attractive farmout deals.

So far the general gripe is about as it has been for several years. "They don't want to make a decent deal on a good prospect. The only thing they want to offer are long shots, and they are pretty chinchy on some of those." Until we hear brokers complaining that they have a lot of high-grade farmout prospects on sweet terms, and still can't get anyone to drill them, the chances are that 1950 will see the majors stepping up their wildcat drilling again.

Charles J. Deegan.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

EAST TEXAS.—Standard Oil Co. of Texas opened a new Strawn field ½ mile east of the city of Sherman, in Grayson County, at its 1 Beth Brown, H. C. Atkinson Survey. Perforations were in sand stringers from 3,348-80 and 3,440-50 ft. Early pumping tests yielded 140 bbl. of 29° gravity oil.

WEST TEXAS.—Standard of Texas 2-5 Brown, 441-97-H&TC, Ellenburger test on the east side of North Snyder field, recovered 20 ft. of mud with no shows on a drill-stem test in the lower Strawn at 7,345-7,401 ft. In northwest Scurry County, Superior Oil & Intex 1 Jordan was reported in the pre-Cambrian at 8,922 ft.

NORTH TEXAS.—The new Ellenburger and conglomerate fields south of Post Oak and in northeastern Jack County, said to be the most active spot in North Texas, will be given added impetus by a new 6-in. pipe line outlet proposed by Stanolind Pipe Line Co. Northern terminal of the line was expected to be in Post Oak field. It will connect with Stanolind's 8-in. line from Graford to Bowie, northeast of Jacksboro.

ROCKY MOUNTAIN AREA.—Superior Oil Co. is continuing to test the world's deepest well at 20,521 ft., total depth. Tests have shown only gas-cut mud. Mule Creek Oil Co. logged 15 ft. of saturated sand at a wildcat west of Fiddler Creek field, Weston County, Wyoming. Roberts Bros. abandoned a 2-mile southeast extension to Ohio Oil Co.'s discovery well in Cheyenne County, Nebraska.

TEXAS GULF COAST.—A new field has been opened in Wharton County with the completion of C. C. Gilger's 1 J. W. Prasifka, which flowed 175 bbl. of oil per day through perforations at 5,545-48 ft., TD 5,620 ft.

MISSISSIPPI

Completion of Russum Discovery Hampered

JACKSON. — Mechanical difficulties continue to retard completion of Stanolind Oil & Gas Co.'s 1 J. B. Dockery, potential discovery well for Russum field, Jefferson County, Mississippi. Operators recovered 3,060 ft. of tubing with over-shot. Over-shot was rerun and picked up the 48 ft. of tubing and packer, which was resting on bottom at 9,822 ft., but after pulling 18 ft., the fish stuck in the casing and over-shot released. Operators left fish in hole and completion attempt was made at this point. After well kicked off, pressures dropped and well died; however, pressures would build up after well was closed in. Well was swabbed several times, but no salt water was recovered. Since flow tests do not correspond with previous drill-stem tests, operator has assumed that condition is due to junk in the hole. Preparations are being made to run milling tool, attempting to mill junk from 9,755 ft. to below 9,774 ft., which is bottom of lowest perforations.

In Lincoln County, Mississippi, Big Chief Drilling Co.-W. B. Osborn 1 George Ziegler is also having completion difficulties. Well was swabbed in and flowed 135 bbl. of oil per day through ¼-in. choke, with 200 psi. flowing pressure. Well then made a head of drilling mud and wash water, resulting in a pressure drop and then died. Well is now closed in for bottom-hole pressure test.

In the recently discovered Armstrong field, Adams County, Mississippi, Sohio, Jones and Kemp are running electrical log below 6,500 ft., at their 2 G. W. Armstrong, in 36-5n-3w, east offset to the discovery well, with less than a foot of oil sand recovered in cores taken below 6,315 ft.

L. M. Lockhart is drilling below 8,315 ft. at his 1 U. S. A., wildcat in 27-6n-4e, north of Bude field, in Franklin County, Mississippi.

Humble Oil & Refining Co. is moving in drilling equipment at its 1 O. B. Bowen, 6-4n-8w, wildcat 3 miles west of Sand Hill field, Greene County, Mississippi.

ALABAMA WILDCAT FAILURE

Choctaw County: A. M. Keisker Dev. Co. 1 Robert Locke, 15-12n-4w, dry, TD 3,497 ft.

MISSISSIPPI WILDCAT FAILURE

Yazoo County: C. G. Raible-E. P. Thomas et al 1 Mollie C. Coker, 36-13n-2w, dry, TD 7,005 ft.

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SOUTH LOUISIANA

Offshore Field Gets New Pay

NEW ORLEANS.—Kerr-McGee's B-4 State Lease 752, in Block 32, Ship Shoal area, offshore from Terrebonne Parish, has been completed in a new sand. The test was drilled from Block 33 and bottomed in Block 30. Total depth of the well is 3,495 ft., and it flowed 120 bbl. of 30.1°-gravity oil per day on gas lift, through perforations at 3,168-83 ft.

Continental Oil Co.'s 1 R. A. Estes, wildcat on the northeast flank of Welsh Dome, in Jefferson Davis Parish, flowed 8 bbl. of distillate in 4 hours plus 2,000,000 cu. ft. gas per day through an 11/64-in. choke, with 4,000 psi. tubing pressure. Total depth of the well is 11,474 ft., and production test was made through perforations at 11,374-87 ft. Operator continues to test.

Callery & Hurt and Phillips Petroleum Co. are testing gas and distillate at their 1 Repp, wildcat in Iberville Parish. Total depth of the well is 11,300 ft., with 5½-in. string cemented at 11,265 ft. Through perforations at 10,809-27 ft., the well flowed gas distillate and wash water through ⅛-in. choke, with tubing pressure of 2,450 psi.

Atlantic Refining Co. has set casing in its 1 Albert Meche, wildcat in St. Landry Parish, 9-7s-3e. Hole is bottomed at 3,898 ft. and 7-in. casing set to 9,590 ft. Operators are now testing through perforations at 9,502-06 ft.

Sohio Petroleum Co. has released location for its 1 Sevignier Hebert, a 12,000-ft. test in the Theal prospect area, Vermilion Parish, Section 6-14s-3e.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

St. Martin Parish: New pay, at Duck Lake —Hunt Oil Co. et al 1 State Lease 1392-Goodrich Unit 1, 2-15s-11e, top sand 12,404 ft., TD 13,595 ft., perf. 12,404-07 ft., IP: 6,000,000 cu. ft. gas per day, shut in, TP 4,100 psi.

Terrebonne Parish: New pay, at Ship Shoal Block 32, offshore, top sand 3,168 ft., TD 3,495 ft., perf. 3,168-83 ft., IP: 120 bbl. oil per day on gas lift, 30.1° gravity.

SOUTH LOUISIANA WILDCAT FAILURES

Avoyelles Parish: Bay Petroleum Corp. 1 Marion Stoops Buckley et al, in 23-4n-3e, approx. 13 mi. N of Marksville, dry, TD 7,510 ft.

Cameron Parish: The Texas Co. 2 Lutcher-Moore Lumber Co., in Mud Lake area, 23-14s-12w, approximately 1 mi. W of the 1 Lutcher dry hole, dry, TD 13,001 ft.

Iberia Parish: Magnolia Petroleum Co. 1 Eugene Island Block 110, State Lease 686, Eugene Island area, 27 miles offshore, dry, TD 12,067 ft.

Washington Parish: S. W. Richardson 1 LSU, 9-2s-12e, 9 mi. NE of Franklinton, La., dry, TD 11,200 ft.

LA.-ARK.

Second Well In At N. Catahoula Lake

SHREVEPORT. — The North Catahoula Lake field of LaSalle Parish received its second and confirmation producer just one week after completion was made on the discovery, Justiss-Mears Oil Co. 1 Harris.

The second well, H. L. Hunt 149-F Nebo, SW SW 35-7n-3e, a north offset, surpassed the discovery, with an initial potential of 160 bbl. of oil a day, flowing through ¼-in. choke, from Wilcox perforations at 4,010-13 ft. Total depth was 4,036 ft. Flowing pressures were 185 psi. on tubing and 650 psi. on casing. Gas-oil ratio was 600 cu. ft.

H. L. Hunt 151-F Nebo, NW SW 35-7n-3e, was last reported drilling near 4,000 ft.

Justiss-Mears 1 Mary Price, new wildcat operation in the NW NW 8-6n-3e, was drilling below 4,250 ft., in the Wilcox.

In Morehouse Parish, Delta Drilling Co. 1 Crosscut Lumber Co., 31-23n-6e, was drilling at 4,749 ft. in the Cotton Valley topped at 3,428 ft., by samples.

Union Oil Co. of California 1 Weatherly-Anderson, Tensas Parish wildcat in SE SW 38-12n-12e, prepared to swabb after running two drill-stem tests. Total depth was 8,823 ft., in the Tuscaloosa, Five-inch casing was run to 8,817 ft., perforated at 8,811-15 ft., then tested from 8,811-17 ft. Using ¼-in. chokes and 800 ft. of water cushion, the recovery was 315 ft. of gas-cut mud, with no pressure recorded. New perforations at 8,808-15 ft., and tested with packer at 8,805 ft., produced 180 ft. water cushion and 2,070 ft. of fine, ashy sand saturated with oil and mud. The section was acidized with 1,000 gal.

In Drew County, Arkansas, Quad Drilling Co. 1 Crossett Lumber, 23-13s-6w, was drilling at 3,408 ft. By samples, it had the Midway at 2,695 ft., and Gas Rock at 3,382 ft.

Lion Oil Co. 1 Loftin, 34-18s-18w, Union County, was still in the Cotton Valley at 8,025 ft. Walter Lown 1 Baker, 22-16s-14w, was waiting on orders at 5,670 ft., total depth in the Smackover.

NORTH LOUISIANA SUCCESSFUL WILDCAT

LaSalle Parish: Justiss-Mears Oil Co. 1 J. E. Harris, NW NW 2-6n-3e, pumped 80 bbl. 39°-gravity oil a day, plus 10 bbl. salt water, Wilcox 0,004-14 ft., TD 5,359 ft. in Midway, PB 4,040 ft., elev. 55 ft. Discovery well, N. Catahoula Lake field.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: Root Petroleum Co. 3 Crystal Oil & Refining Co., NE SE 4-19n-12w, dry, TD 3,524 ft., core test.

Caldwell Parish: Sohio Petroleum Co. 1-C LaSalle Land Co., SE NW 27-13n-5e, dry, TD 6,347 ft., Tuscaloosa 5,582 ft., Comanchian 6,200 ft., sand 6,300-20 ft. had salt water, elev. 68 ft.

Catahoula Parish: H. J. Strief 1 W. S. Peck, 2,400 ft. S, 2,723 ft. E of NW corner, irregular Section 41-10n-8e, dry, TD 8,762 ft., Wilcox 3,136 ft., Midway 5,923 ft., Arkadelphia 6,562 ft., Austin 7,528-7,826 ft., Tuscaloosa 7,966 ft., lower Cretaceous 8,751 ft., elev. 78 ft., no shows.

Claiborne Parish: Hunt Oil Co. 1 J. H. Owens, NE NE 19-23n-6w, dry, TD 12,468 ft. in salt, Smackover "A" zone 11,155 ft., "B" 11,255 ft., top salt 12,460 ft., elev. 280 ft.

DeSoto Parish: Carnes, Halbouty & Blalock 1 W. C. Nabors, NW NE SE 21-12n-12w, dry, TD 6,620 ft., electcric log 6,609 ft., Massive anhydrite 4,535 ft., James lime 5,434 ft., Sligo 5,743 ft., Pettit 6,268 ft., elev. 341 ft.

ARKANSAS WILDCAT FAILURES

Ouachita County: McAlester Fuel Co. 1-A H. L. Berg, NW NW NW 17-15s-18w, dry, TD 3,777 ft., no shows, elev. 168 ft.

Petersen Drilling Co. 3 J. S. Dean, SW NE SE 16-14s-19w, dry, TD 1,292 ft., light oil show 1,287-92 ft., Midway 949

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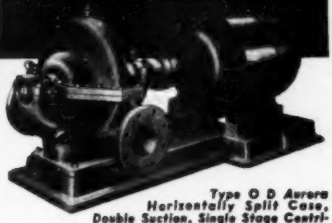

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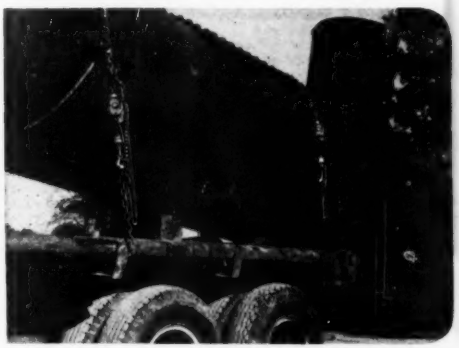

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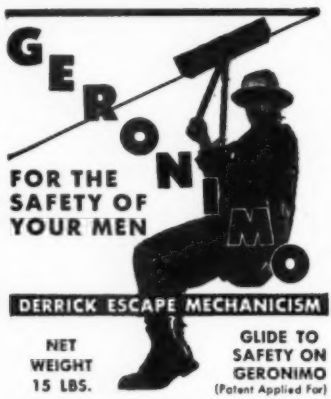

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ft., Arkadelphia 1,171 ft., Nacatoch 1,260 ft., elev. 228 ft.

Union County: H. B. Brown 1 T. W. Hudson, SE NW NW 17-19s-13w, dry, TD 3,515 ft., Arkadelphia 2,104 ft., Nacatoch 2,194 ft., Saratoga 2,396 ft., Tuscaloosa 2,910 ft., Hogg sand 3,356-88 ft., no shows, Pettit 3,452-77 ft., no shows, elev. 229 ft.

KANSAS

Russell County Wildcat Finds New Arbuckle Pool

A NEW pool for Russell County appears to have been discovered by Shields & Anschutz in their 1 Anschutz, NW SW SW 25-13-14. In the Arbuckle at 3,273-88 ft. (—1,443-58 ft.), with casing perforated to 3,286 ft., the hole filled up 2,000 ft. with oil in 12 hours. Swabbing is under way. The well is 1 mile east of the Russell pool and about ½ mile east of the town of the same name.

A mile east of the Trapp field in the same county, El Dorado Refining Co. found saturation in both the Tarkio and Dodge zones in its 1 Ely, NE NE NE 15-15-13, but is drilling deeper in exploration of the Lansing and Arbuckle. A 30-minute drill-stem test of the Tarkio at 2,456-81 ft. resulted in a recovery of 90 ft. of oil-cut mud. Indicated bottom-hole pressure was 730 psi. In a drill-stem test of the Dodge zone, with tool open 1 hour, 40 ft. of heavily oil and gas-cut mud was recovered. Elevation is 1,817 ft.

Drillers Gas Co. has opened a new gas pool in Harvey County with the completion of its 1 Warkentin, SE SE NW 16-23-3, flowing 6,000,000 cu. ft. daily from the Mississippian. Casing, cemented at 3,328 ft., was perforated at 3,304-19 ft. Top of the Mississippian was checked at 3,261 ft. (—1,799 ft.). Hole was drilled to 3,372 ft. The well is about ¾ mile east of a 13,000,000-cu. ft. gasser completed early this year by Wingate-Greenland Oil Co. in the same pay, and about 1 mile east of the Burton oil pool.

Another new pool or a possible extension to the Pawnee Rock pool in northeastern Pawnee County is in the making at Jayhawk Drilling Co. and Vickers Petroleum Co. 1 Dirks, NE NE SW 23-20-16, where testing of showings encountered in the Arbuckle, topped at 3,743 ft. (—1,718 ft.) is under way. Gas production estimated at 2,000,000 cu. ft. per day was indicated in a drill-stem test at 3,744-53 ft. A second drill-stem test at 3,756-65 ft. resulted in a recovery of 60 ft. of oil-cut mud. In a third test taking in an interval at 3,763-75 ft., some free oil and 165 ft. of heavily oil-cut mud was recovered. Casing is at 3,760 ft. Although only ¾ mile west of the Pawnee Rock pool, it is separated from the pool by a dry hole.

KANSAS SUCCESSFUL WILDCAT

Russell County: J. L. Oil Co. and Murfin 1 Erlich "B," SE SE NW 17-14s-13w, pumped 90 bbl. of oil per day from Tarkio at 2,396-2,435 ft.; anhydrite 833 ft., TD 2,435 ft.

KANSAS WILDCAT FAILURES

Barton County: Nadel & Gussman 1 White, SW SW SW 5-19s-13w, dry, TD 3,493 ft., anhydrite 800 ft., Lansing 3,032 ft., Heebner 3,111 ft., Lansing 3,228 ft., Arbuckle 3,462 ft.

Ferrell Drilling Co. 1 Christians, SW SW NE 20-16s-12w, dry, TD 3,387 ft., anhydrite 830 ft., Lansing 3,081 ft., Arbuckle 3,333 ft., granite wash 3,372 ft.

Butler County: Rex & Morris 1 Ohlsen, SE SW SE 30-25s-3e, dry, TD 2,861 ft., Lansing 1,780 ft., Kansas City 2,080 ft., Mississippian 2,805 ft.

Chase County: Aladdin Petroleum Co. et al 1 Altemus, SE SE NE 26-18s-8e, dry, TD 3,250 ft., Kansas City 1,535 ft., Mississippian 2,524 ft., Kinderhook 2,800 ft., Hunton 2,915 ft., Sylvan 2,938 ft., Viola 2,987 ft., Simpson shale 3,090 ft., Simpson sand 3,142 ft., Arbuckle 3,147 ft.

Marion County: Flack & Scanolin et al 1 Good, SW SW SE 20-20s-4e, dry, TD 2,670 ft., Kansas City 1,724 ft., Mississippian 2,250 ft., Misener 2,472 ft., Viola 2,504 ft., Simpson 2,585 ft., Arbuckle 2,647 ft.

McPherson County: Lebow Drilling 1 Schmeider, SE SE NE 28-18s-3w, dry, TD 3,760 ft., Kansas City 2,424 ft., Mississippian 3,146 ft., Viola 3,627 ft., Simpson sand 3,671 ft., Simpson dolomite 3,678 ft., Arbuckle 3,735 ft.

Rooks County: Veeder Supply et al 1 Cole, SW NW SW 1-6s-20w, dry, TD 3,574 ft., anhydrite 1,725 ft., Topeka 3,038 ft., Heebner 3,238 ft., Dodge 3,254 ft., Lansing 3,265 ft., basal Kansas City 3,442 ft., Reagan 3,526 ft., pre-Cambrian 3,561 ft., granite 3,573 ft.

S. A. Murphy et al Bouchey, NE NW NW 18-18w, dry, TD 3,494 ft., Heebner 3,152 ft., Toronto 3,172 ft., Lansing 3,192 ft., conglomerate 3,481 ft., Arbuckle 3,493 ft.

CANADIAN FIELDS

Gulf Trying for Pincher Creek Water Shutoff

CALGARY.—Testing at the Canadian Gulf Oil Co. 1 Walter Marr wildcat at Pincher Creek in the foothills belt is continuing in anticipation of obtaining commercial water-free oil production. During latest 16 hour drill-stem test, after plugging back from bottom 12,768 ft. to 12,448 ft., the well gave a natural gas flow rate of 6,500,000 cu. ft. daily, plus a fluid recovery of 133.8 bbl. of light crude oil and 68.9 bbl. of water. Test was made with the packer set at 12,186 ft. The well is situated in LSD 1, 29-4-29w4. Meanwhile, also at Pincher Creek, in LSD 4, 35-3-29w4, Gulf 1 Fred Shrempp is drilling below 11,640 ft.

Pacific Western Oil Co. is starting a Devonian test on the Eastern Alberta Plains, just east of Sullivan Lake, 25 miles north of Hannam and 110 miles northeast of Calgary. The new wildcat, Pacific Western 1 Sullivan Lake, has been staked in LSD 4, 1-35-13w4, in virgin territory, on the basis of core drilling that the company did on the 57,440 acre Crown Reservation held by J. S. Irwin and Associates of Calgary.

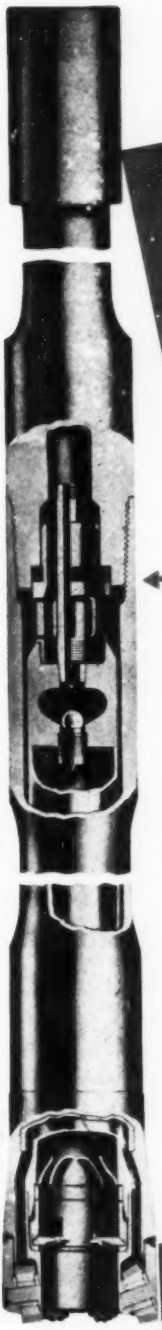
Pacific Petroleums, Ltd., of Calgary has joined forces with the Thomas Pike Drilling Co. of Los Angeles to drill a seismograph feature in the Nestow area, about 40 miles due north of Edmonton, on the Central Northern Alberta Plains. The new venture, 1 Nestow, is located in LSD 9, 13-60-25w4, on a farmout seismograph feature obtained under agreement from Imperial Oil, Ltd. Drilling operations will get under way shortly.

The Ed-Bridge Petroleum Co., a new Edmonton company, organized by C. R. Walker, is starting drilling on NE¼ 37-57-22w4, a Redwater Crown Reserve lease, under farmout agreement with the four oil companies who purchased the tract from the Alberta Government. Owners of the lease are: Pacific Petroleums, Sunray Oil Co., Princess Petroleums, Ltd., and Calvan Petroleums, Ltd. First location will be LSD 16.

Peace River, Northeast British Columbia.—Drilling is slated to start at an important wildcat well in the Peace River Block of northeast British Columbia, backed by the team of Pacific Petroleums, Ltd., Peace River Natural Gas Co. of Vancouver, and Sunray Oil Co. (American independent). The location for Peace River test well No. 8 has been staked in LSD 13, 11-81-17w6, about 20 miles northwest of Dawson Creek, and the same distance southwest of Fort St. John, along the Alaska highway. The well will be a deep test of both oil and gas possibilities.

WESTERN CANADA WILDCAT FAILURES

Socony-Craigmyle No. 3, LSD 11, 32-32-16w4, TD 4,117 ft.



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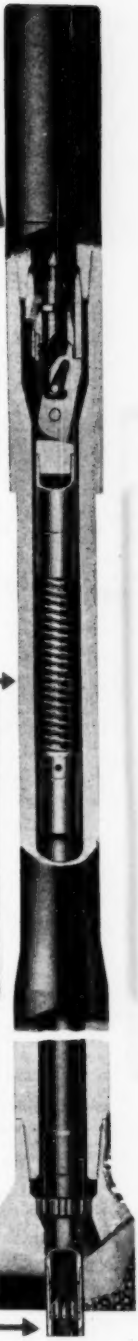

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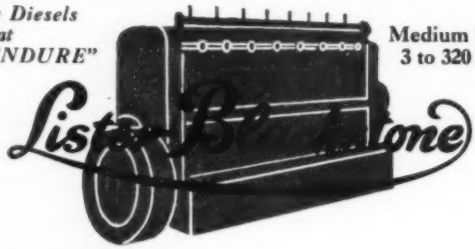

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Fincastle Province No. 44-19A, LSD 7, 19-10-15w4, TD 2,469 ft.

TEXAS GULF COAST

Lavaca and Wharton Counties Get New Fields

HOUSTON.—A new oil pool is indicated by Great Lakes Carbon Corp. et al 1 Alton C. Allen, wildcat 1 mile northwest of the Paulding gas-condensate discovery and 1 mile east of the Provident City field, Lavaca County. On drill-stem test at 6,112-20 ft., the well recovered 510 ft. of 41.5°-gravity oil through ½-in. choke, and developed 100 psi. working pressure.

C. C. Gilger has opened a new field in the "Prasifka" gas-producing area south of Lane City, Wharton County, with his 1 J. W. Prasifka. The well flowed 175 bbl. of oil per day through 5/32-in. choke through perforations at 5,545-48 ft., with 610 psi. tubing pressure and casing sealed. Total depth of the well is 5,620 ft., with 5½-in. casing set on bottom for completion.

Potential gage has been reported for McCarthy Oil & Gas Corp. 1 R. F. Willy, discovery well for Collins Lake, Brazoria County, 4 miles southwest of Angleton, Tex. The well was drilled to total depth of 12,200 ft. and flowed 322 bbl. of 33.1°-gravity oil per day through perforations at 9,182-90 ft. through 13/64-in. choke. The well is dually completed and is flowing gas from sands at 9,800 ft.

New oil production is being opened on the northwest flank of the South Liberty Dome, in Liberty County, with the completion of L. M. Josey's 1 A. W. Abshire. Hole was drilled to total depth of 8,037 ft. and 7-in. casing was cemented at 7,165 ft. On drill-stem test at 6,800-12 ft. (Yegua sands), the well flowed at the rate of 150 bbl. of 31°-gravity oil per day through ¼-in. choke, and developed 1,600 psi. working pressure. Operators are preparing to make a final gage.

Jack W. Frazier's 1 H. B. McCrary, in the West Clodine area, Fort Bend County, James Perry Survey, promises to open a new pool. On initial test made through perforations at 7,304-07 ft., the well flowed 30 per cent oil, 30 per cent wash water and 40 per cent basic sediment and water, with 440 psi. flowing pressure on the tubing. Operators have reperforated at 7,308-10 ft. and are now setting the packer for test.

TEXAS GULF COAST (DISTRICTS 2 & 3)
SUCCESSFUL WILDCAT

Harris County: New pay at Humble—Riley A. Gwynn 1 A. W. Wagner, in E. Ruhl Sur., top sand 3,606 ft., TD 4,517 ft., perf. 3,652-60 ft., IP: 127 bbl. oil per day, open flow, GOR 5,817 cu. ft., TP 60 psi., 41° gravity.

TEXAS GULF COAST (DISTRICTS 2 & 3)
WILDCAT FAILURES

Brazoria County: Freeport Sulphur Co. A-1 Freeport Sulphur Co. fee, at Bryan Mound, in Hy Burt Sur., A-151, 3½ mi. SW Freeport, dry, TD 4,807 ft.

Grimes County: The Texas Co. 1 W. E. Moody, in Piedmont area, James Cox Sur., dry, TD 8,402 ft.

Jefferson County: Placid Oil Co. 1 Alexander Woldert, in J. C. Lawhorn Sur. A-35, 2 mi. NW of Fannett, dry, TD 9,511 ft.

Jackson County: Central Drilling Co. 1 R. Yaussi, in P. White Sur., A-83, dry, TD 2,814 ft.

Caroline Hunt Trust Est. 1 Myrtle White, in Sylvanus Hatch Sur., A-27, 3 mi. S of Edna, dry, TD 6,855 ft.

Karnes County: H. R. Smith, Rodney DeLange & W. E. Fox, Tr., 1 J. S. Carriger, in Caspar Flores Sur., 10 mi. SW of Falls City, dry, TD 3,635 ft.

Wharton County: J. B. Ferguson-Progress Petroleum Co. 1 Clara Franke et al, in H&TC Sur. 12, 6 mi. NW of Pierce, dry, TD 6,002 ft.

SOUTHWEST TEXAS

Jim Hogg County May Have New Discovery

CORPUS CHRISTI.—Dulaney Oil Co.'s 2 Robert Holbein et al promises to open a new field in Jim Hogg County. On 15-minute drill-stem test in the Albercas sand at 2,142-53 ft., the well recovered 900 ft. of heavily oil-cut mud through ¼ and 1-in. chokes, plus a little water cut with gas, and developed 26 psi. working pressure. Total depth of the hole is 2,153 ft., with casing set on bottom.

Gas-condensate production is being extended southward in the Scott & Hopper field, Brooks County, by the L. M. Lockhart 1 Consuelo de Pena. The well tested gas-condensate through perforations at 6,900-12 ft., with no gage reported as yet. The gas sand was logged at 6,894-915 ft. Total depth of the well is 7,050 ft., with casing set on bottom.

The Atlantic Refining Co. is running production tests in its 1 State Tract 230, wildcat in Aransas Bay, approximately 5½ miles southeast of Rockport, Aransas County. The hole was drilled to a total depth of 11,003 ft. and 9⅝-in. protection string set to 7,990 ft. The hole was then plugged back to the casing seat, and perforations made at 7,504-14 ft. for the initial production test.

The new "Divot" extension well, M. L. Massingill et al 1 J. B. Park, in Frio County, has been put on the pump for final completion after the well came in flowing heads of oil from the Austin chalk. Difficulty was encountered on completion attempt from this zone, when faulty cement job in the Navarro zone caused water intrusion. However, operators were successful in shutting off this intrusion. Hole is bottomed at 5,910 ft. and completion will be made from open hole at 5,483-910 ft.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Brooks County: Discovery—Humble Oil & Refining Co. 4 Santa Fe Ranch, in San Salvador del Tule Grant, in Santa Fe area, top sand 5,896 ft., TD 8,491 ft., perf. 5,896-904 ft., IP: 2,850,000 cu. ft. gas per day, open flow.

Cameron County: Oil discovery—Sidney H. Smith, Jr., 1 O. W. Johnson, Lacy Outpost, 3 mi. SW of Santa Rosa, top pay 7,536 ft., TD 7,552 ft., perf. 7,547-50 ft., choke, GOR 1,600 cu. ft., TP 1,000 psi., IP: 118 bbl. oil per day through ⅛-in. CP 2,400 psi., 45° gravity.

Duval County: Discovery—Glenn G. Mortimer, Jr., 1 W. R. Peters, in AB&M Sur. 176, 20 mi. N of Bruni, top sand 2,474 ft., TD 2,671 ft., perf. 2,474-84 ft., IP: 700,000 cu. ft. gas per day on open flow.

Hidalgo County: New pay, at La Reforma—Baldridge & King, Inc., 1 Josefa Hinojosa, in San Jose Grant, 2 mi. S of La Reforma, top sand 8,430 ft., TD 8,511 ft., perf. 8,430-46 ft., IP: 1,200,000 cu. ft. gas per day, on open flow.

San Patricio County: New pay, at Morgan—Arnold O. Morgan-H. M. Reed 1 P. L. Johnson, in Geo. Morris Sur., top sand 6,564 ft., TD 7,433 ft., perf. 6,564-69 ft., IP: 6,200,000 cu. ft. gas per day, on open flow.

Starr County: Oil discovery, at Southeast Lockhart—I. K. Howeth et al, 1 Domingo L. Garza, approximately 1¼ mi. SE of oil production at Lockhart field, 10 mi. NE of Rio Grande City, top sand 4,026 ft., TD 4,063 ft., perf. 4,034-36 ft., IP: 71 bbl. oil per day through 3/16-in. choke, GOR 600 cu. ft., TP 650 psi., CP 1,125 psi., 45.5° gravity.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Bandera County: A. M. Smith 1 W. H. Lewis, in Antonio Curvier Sur. 71, 2 mi. NE of Medina City, dry, TD 645 ft.

Duval County: John F. Camp & Sons E-5 James F. Welder Heirs, in AB&M Sur. 227, 1½ mi. SW of Squire field, dry, TD 3,481 ft.

Taylor Refining Co. S-1 E. A. Parr, in SA&MGRR Sur. 5, 1 mi. NE of N extension to Agua Prieta field, dry, TD 4,823 ft.

Frio County: Alaska Steamship Co. & Newman Bros. 1 Oppenheimer & Lang, in M. Bulwar Sur. 212, A-66, 10 mi. E of Pearsall, dry, TD 4,194 ft.

McMullen County: Utah Oil Corp. 1 Nueces Land & Livestock Co., in GWT&P RR Co. Sur. 167, A-530, 1⅘ mi. N of Munson field, dry, TD 1,376 ft.

Milam County: Roland B. Paxton, Trustee, 2 Paul Graves, in Charles Croñea Sur., 2 mi. W of Sharp, dry, TD 1,010 ft.

Starr County: J. P. Martin 1 Anna M. K. Bass, in Porcion 76, Camargo Juris, 2 mi. N of Los Olmos field, dry, TD 2,503 ft.

Webb County: O. W. Killam 1 Bruni Est., 7½ mi. S of Bruni, 1½ mi. N of South Bruni field, dry, TD 4,069 ft.

Zapata County: Dulaney Oil Co. 4 Alice Doran Haynes, in Block 18, Alice Doran Haynes Subdivision, Villa Grant, dry, TD 1,397 ft.

EASTERN TEXAS

New Wynne Field May Have Second Producer

DALLAS.—R. W. Fair 2 Angus Wynne, confirmation test 680 ft. southwest of the discovery, in the Cedarvale area of Kaufman County, was showing for a producer but field reports indicated it ran a little low to the discovery.

Top of the Paluxy was not reported. A core from 4,988-88 ft. recovered 15 ft., being 13 ft. of oil sand and 2 ft. of sand carrying salt water. A 10-minute drill-stem test between packer at 4,968 ft. and 4,988 ft., total

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depth, using ¼-in. chokes top and bottom, produced a maximum surface pressure of 5 psi. and recovered 120 ft. of oil-cut mud, 780 ft. of oil, 540 ft. of oil and water, and 300 ft. of salt water. Bottom-hole flowing pressure was 1,960 psi., and 2,150 psi. after shut in for 10 minutes. Electric log was run to total depth, and operators prepared to run casing. Field tickets have been showing the new pool as the Wynne field.

In Anderson County, Continental Oil Co. 1 Royall National Bank, A. G. Monroe Survey, A-56, ½ mile southeast of Tennessee Colony, was drilling lime and shale at 6,170 ft. Electric log tops released were: Woodbine 4,758 ft., Comanchean 5,512 ft., Buda 5,602 ft. Elevation is 339 ft.

Atlantic Refining Co. 1 M. P. Isom, Harrison County wildcat 7 miles northwest of Hallsville, reported flows of gas and distillate from both the Travis Peak and Rodessa sections. The amount of flow or distillate yield was not estimated. After acid treatment of the bottom Travis Peak perforations, the well flowed gas and condensate under 2,500 psi. pressure, through ¼-in. choke, from perforations at 7,394-7,906 ft. From the Rodessa perforations, at 6,734-6,793 ft., it also tested gas and condensate through ¼-in. choke, under flowing pressure of 800 psi. The well developed a pressure of 2,000 psi. on surface casing, and at last report operators were attempting to kill the well.

Humble Oil & Refining Co. 1-B Minton, Shadrich Morris Survey, A-42, prepared to core ahead below 6,394 ft., total depth. A 50-ft. recovery from 6,344-94 ft. was dense, nonporous lime with no shows.

In Wood County, 2 miles south of Alba, Shell Oil Co., Inc., 1 Consumers Lignite Co. was pumping nearly all salt water, as testing continued on sub-Clarksville perforations at 4,153-70 ft. Operators believed there was a possibility of a channeling job, accounting for the increase in water. Amount of oil or water recovered was not reported.

In Van Zandt County, 4 miles southeast of Grand Saline, E. B. Germany & Sons 1 Skinner entered the Woodbine, which carried water, at 4,490 ft., on an elevation of 440 ft. It was drilling ahead below 4,510 ft., toward the Paluxy.

EAST TEXAS (DISTRICTS 5, 6 & 6-P)
SUCCESSFUL WILDCAT

Wood County: F. R. Jackson 1 Joe Carr, James Colson Sur., 4 mi. W Mineola, pumped 30 bbl. 18°-gravity oil a day, sub-Clarksville top 4,612 ft., perforated 4,612-36, 4,644-56 ft., TD 4,740 ft., PB 4,650 ft., elev. 379 ft.

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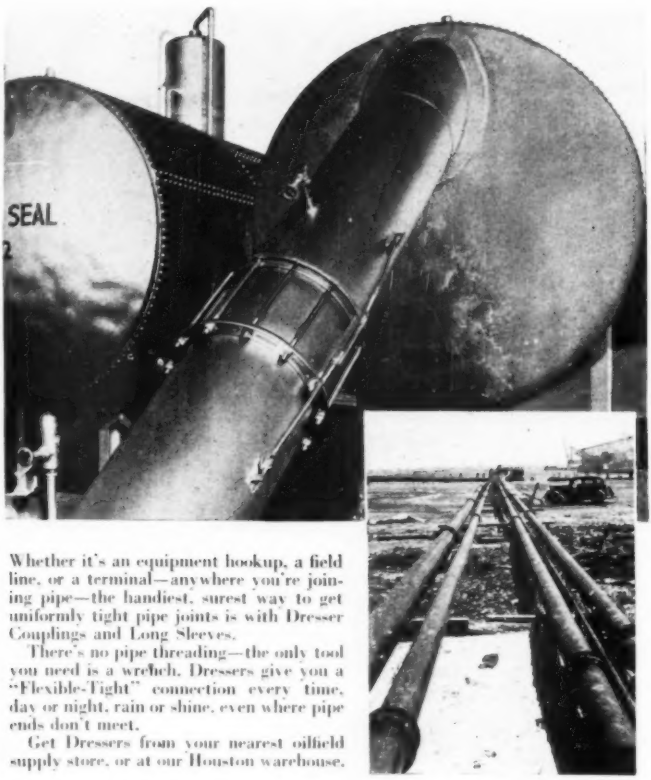

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CALIFORNIA

Placerita Getting Fast Development

LOS ANGELES.—Development of the Placerita field continues at a fast rate, with 6 wells completed last week for a total initial production rating of 8,110 bbl. Rothschild Oil Co. completed 1 Howell Comm. at 1,725 ft. for 2,000 bbl., and 2 Rassp at 1,889 ft. for 1,500 bbl. Both of the new wells are in Section 31-4n-15w.

In the same section Gordon Oil Co. completed 7 Peggy Moore at 1,603 ft. flowing 2,000 bbl. and 6 Wickham-Ferrier pumping 250 bbl. while Watkins & Horton, Inc., brought in 1 Pat at 2,045 ft. for 1,860 bbl. In Block 30 Independent Exploration Co. finished 1 Placerita at 2,280 ft. for 500 bbl.

Gravity of the oil produced in this field varies from 24° to 19°. In general, the lighter oil is found in the shallower wells. Terminal Drilling Co. abandoned its Placerita test in Mint Canyon. Its 1 Independent-Ghiggia was dry at 1,922 ft. in 24-4n-16w. Rothschild's 1 Perkins test in 11-3n-16w is idle at 4,963 ft. The B. F. Delanty 1 Nadeau is cleaning out at 1,338 ft. This is located in 28-4n-15w.

Five new well locations were set in the Placerita field this week. Four of these are development and one is a test in Section 32-4n-15w by Range Oil Co. 1 Dorothy.

E. C. Von Glahn's 4 Oceanside wildcat pumped 4 bbl. of 12°-gravity oil on a test from total depth of 408 ft. This would be a new discovery but final completion of the well has not been announced. The well was drilled with cable tools in 33-22s-16w in Kreyenhagen Hills, Fresno County.

In the Tejon area, Kern County, Von Glahn Oil Co. will deepen 1 Tejon. This well was formerly abandoned in Gray sand at 1,485 ft.

In the Fruitvale field, Alta Knolls Oil Co. has deepened the former 1 Osborne of the Mohawk Petroleum Co. Total depth is now 3,834 ft. with plug set at 3,815 ft. Upper Kernco was topped at 3,593 ft. and the Middle Kernco at 3,758 ft. Tests are being run from plug to 3,600 ft.

None of the six tests now drilling in Carrizo Plains report any improvement in findings. Oil sands continue to be located but they are very tight and so far have shown no production on test. The deepest well in the group is Gene Reid et al. Temblor-Rexroth 67-36 at 3,436 ft. Union Oil's 1 Wreden is next deepest and is drilling ahead at 2,098 ft.

Location for an exploratory well has been set in San Benito County, 5 miles northeast of Hollister. The well will be drilled by Barnes & Shadrick for Centennial Oil Co. in Section 3-12s-6e.

Humble Oil & Refining Co. has so far failed to find production in their test on the south edge of the Paloma field. Its 1 KCL 54-9 has reached the top of what was expected to be the first producing zone at 11,000 ft. Tests produced salt water without color. The well will be carried down to test other formations.

In the State of Washington, Union Oil Co. State No. 3, near Oceanside, is drilling at 7,460 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Ant Hill area: State Exploration Co. 1 Clarke, 20-29s-29e, dry, top Santa Margarita 1,308 ft., TD 1,345 ft., elev. 723 ft.

Comanche Point area: B. C. Mackey 1 Rogers, 27-12n-18w, dry in granite, TD 999 ft., elev. 1,052 ft.

Wa-me-co Drilling Co. 1 Cal-Wag, 33-12n-18w, dry, top Santa Margarita 805 ft., elev. 856 ft.

Tejon area: Vista Oil & Development Co. 1 V. O. D., 24-11n-18w, dry, top granite 612 ft., TD 614 ft., elev. unknown.

Trico area: Standard Oil Co. 1-1 Trico unit, 29-25s-24e, dry, tested salt water at 2,600-20 ft., TD 4,200 ft., elev. 247 ft.

Los Angeles County, Placerita area: Terminal Drilling Co. 1 Independent-Ghiggia, dry, TD 1,922 ft., elev. 1,381 ft.

Monterey County, San Ardo area: Jergins Oil Co. 2 USL North, 2-22s-11e, dry, top granite 2,497 ft., TD 2,546 ft., elev. 1,687 ft.

San Luis Obispo County, Creston area: The Texas Co. 1 O'Donovan, 21-27s-14e, dry, TD 2,803 ft., elev. 1,504 ft.

Huasna area: Western Gulf Oil Co. 1 Porter, 13-32s-15e, TD 2,939 ft., elev. 1,240 ft.

Ventura County, Somis area: Humble Oil & Refining Co. 1 Berlywood Inv. Co., 32-3n-20w, dry, TD 9,292 ft., elev. 677 ft.

Yolo County, Pleasant Creek area: Shell Oil Co. 5-1 Unit, 18-8n-1w, dry, TD 3,002 ft., elev. 190 ft.

MICHIGAN

Offset to Discovery Confirms Traverse Pay

MOUNT PLEASANT.—The first successful Traverse lime completion to follow the discovery drilled by John A. Thompson in Green Township, Mecosta County, appeared to have been scored by Rex Oil & Gas Co. 1 Cox, SE SW SE 21-16n-10w, diagonal offset to the discovery producer.

The Rex well was reported to have flowed and swabbed about 80 bbl. of fluid natural, with some bottom-hole water showing. After acidization with 1,000 gal., it flowed 26 bbl. of net oil the first 30 minutes. Production was being pinched in to 125 bbl. daily. Traverse was logged at 2,888 ft. and hole was bottomed out at 2,936 ft. Pay was gun-perforated with 59 shots between 2,922-28 ft.

Basin Oil Co. 1 Badour-Fritch, SW NE SW 15-14n-6e, Essexville field semioutpost test, Bay County, was rated good for 300 bbl. a day on initial tests after acid treatment in the Dundee with 1,000 gal. Top of objective was logged at 2,659 ft. and well was drilled to a total depth of 2,883 ft. Production was being restricted to about 100 bbl. a day. Basin had moved tools further to the southeast for another test in the district and was reported to be making tentative plans to start two other close-in wells.

In the shallow Traverse area in Allegan County, Ohio Oil Co. had what appeared to be the first follow-up producer to company's recent discovery in Clyde Township, while new developments to the south of the South Hopkins pool offered prospects of a new drilling play in this area. Ohio's 2 Jerans et al, SE SW SE 25-2n-13w, second 10-acre location west of the discovery, was under test in the Traverse at 1,275 ft. following acidization with 500 gal. This well flowed 33 bbl. of net oil first hour on test. Traverse lime was at 1,269 ft.

Cook Drilling Co. added a new 50-bbl. producer in the South Hopkins pool, while J. W. Lang Co. 1 Wheatley, SW SW NW 32-3n-12w, first South Hopkins developmental well in Section 32, showed a commercial pay at a total depth of 1,559 ft. and was under test following acidization.

MICHIGAN WILDCAT FAILURES

Arenac County, Mason Township: Frank E. Roush 1 Brown, NW NW NE 23-20n-5e, Dundee 2,802 ft., dry, TD 2,985 ft.

Barry County, Assyria Township: Clifford A. Perry 1 Beech, NE SW SW 20-1n-17w, Traverse 1,787 ft., dry, TD 1,832 ft.

Osceola County, Rose Lake Township: Union Development Co. 1 Archbold, SE NE SE 8-19n-9w, dry in Coldwater series, TD 1,900 ft.

Van Buren County, Porter Township: Fisher-McCall Oil & Gas Inc., 1 Erwin, SE SE SE 5-4s-13w, Traverse 1,208 ft., dry, TD 1,215 ft.

South Haven Township: Louis Zellman 1 Hockman, SW NW SE 1-1s-17w, Traverse 1,070 ft., dry, TD 1,074 ft.

PERMIAN BASIN

SE Benedum Well Gets 41° Gravity Oil

MIDLAND.—Completion of Plymouth Oil Co.'s 1-45 Emma J. Johnson, on the southeast end of the Benedum multiple-pay field, but across the county line in Regan County, established confirmation production of 41°-gravity oil from the Bend section of the Pennsylvanian. The 1 Johnson in NW SW 45-Y-MK&T Survey is a northeast offset to the 1 Elliott. The new well made a natural potential of 563 bbl. of 41.4°-gravity oil, corrected, in 24 hours, flowing through ¼-in. choke on 2-in. tubing set at 10,720 ft. Gas-oil ratio was 1,860 cu. ft.; flowing pressures were not reported. On an elevation of 2,966 ft., the well had top of pay at 10,650 ft., and total depth at 10,750 ft. Seven-inch casing was run to 10,137 ft., with 5-in. liner at 10,048-748 ft.

In northern Upton County, Magnolia Petroleum Co. 1-36 Roy Glass, 36-41-T&P, ⅜-mile southwest outpost to the Pegas Ellenburger field, reported additional pay in the Pennsylvanian, as drill-stem tests continued.

First drill-stem test reported, from 10,207-260 ft., developed a flow of 14½ bbl. of 46.2°-gravity oil in 25 minutes, with a gas-oil ratio of 4,500 cu. ft. The test was terminated when the packer failed. A second test was run from 10,255-294 ft., with the tool open 2 hours. Gas came to the surface in 8 minutes, estimated at 167,000 cu. ft. daily, and recovery was 1,890 ft. of 40.8°-gravity oil, 630 ft. of heavily oil and gas-cut mud, plus 300 ft. of drilling mud. It was drilling ahead.

Across the line in Midland County, Magnolia 2-30 Roy Glass, Section 30, was drilling below 11,069 ft. in shale, believed to be the Woodford.

Andrews County.—Magnolia 18-B Cowden, NE NE 12-A55-PSL, was slated for dual completion from the Devonian and from the Fusselman section of the Silurian, according to field reports. Last reported 24-hour test on the Devonian, from 10,186-201 ft., gaged 246 bbl. of oil, through 24/64-in. choke. Gravity was 40.6°, and gas-oil ratio 785 cu. ft. It was not known whether or not additional Devonian perforations would be made. Previous tests have shown a much thicker pay section than the above perforations.

Scurry County.—Location for a wildcat test 2½ miles north of Snyder, and 3 miles south of nearest production in the North Snyder area, has been announced by Standard-Fryer Drilling Co. Its 1 Ed S. Wilkinson, center of the southwest quarter, Lot 24, Section 17-4-J. P. Smith Survey, will be drilled to 7,500 ft.

Location of the 1 Wilkinson is about 6 miles north of the Kelly field discovery, which this week received a west offset and extension well at Magnolia 1 Ida Maxwell, 206-97-H&TC Survey. The 1 Maxwell flowed 178 bbl. of 41°-gravity oil daily through 12/64-in. choke, from open hole at 6,805-33 ft. Gas-oil ratio was 1,071 cu. ft.

A northeast extension try to the west Kelly pool was staked as George P. Livermore, Inc., 1 J. E. Woodson, NW NE 209-97-H&TC. It is scheduled to 7,000 ft.

Lubbock County.—Slick-Moorman Oil Co. and C. W. Chancellor 1 Cloud, NE SE 22-D-L&SV, 10 miles north and 2 miles west of the city of Lubbock, reported top of the Glorietta lime at 4,570 ft., on an elevation of 3,313 ft., which checks about 12 ft. low to Seaboard Oil Co. of Delaware and Stanolind Oil & Gas Co.'s 1 Cravens, small pumper ¾ mile to the northeast, which had pay around 5,500 ft. in the Glorietta. Drilling continued below 4,723 ft.

Howard County.—C. L. Norsworthy, Jr., 1 Christian, Pennsylvanian exploration in the SE SW 48-32-T2N-TP Survey, 10 miles north of Big Spring, ran a 2-hour drill-stem test on the Sprayberry lime, of the lower Permian, from 6,027-6,130 ft. It produced a steady blow of air throughout the test and recovered 570 ft. of slightly gas-cut salty drilling mud having a rainbow show of oil, plus 1,590 ft. of salt water. Flowing bottom-hole pressure was 230 psi. It was to drill ahead.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCATS

Gaines County: Ralph Lowe & Helen Cunningham, SE NW 4-A24-PSL, 10 mi. SW Seminole, flowed 458 bbl. 47°-gravity oil a day, ¾-in. choke, Wolfcamp pay at 8,850-8,950 ft., GOR 300 cu. ft., TP 60 psi., TD 11,881 ft., elev. 3,371 ft.; extension and new pay in the Doss Clear Fork field.

Runnels County: Texas Union Oil Corp. 1 Hugh Campbell, J. Bays Sur. 530½, 4 mi. N Winters, pumped 4 bbl. oil a day, Palo Pinto 3,360 ft., TD 4,602 ft., PB 3,390 ft., elev. 1,682 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Hockley County: E. Constantin, Jr. 1 J. H. Goodpasture, Tract 2, Sec. 4, William Tubb Subd., 5 mi. W Smyer, dry, TD 6,214 ft., San Andres 3,960 ft., Glorietta 5,470 ft.

Mitchell County: Ted Weiner 1 Iowa Realty Trust Co., 69-10-H&GN, dry, TD 5,355 ft., Yates 1,088 ft., Grayburg 1,740 ft., Simpson 4,661 ft., Ellenburger 5,185 ft., elev. 2,445 ft.

Tom Green County: M. E. Davis and Hiawatha Oil Co. 1 W. C. Jones estate, NW NW 190-Dist. 11-SPRR Sur., 8 mi. SW Wall, dry, TD 6,149 ft., Canyon 4,362 ft., Strawn 4,890 ft., detrital 5,630 ft., Ellenburger 5,770 ft., elev. 2,021 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—One mile southwest of its 1-BTA discovery, Amerada 1 Caudle-Federal, SE NE 10-12s33e, plugged back to 9,035 ft. to continue testing. At plugged-back total depth of 9,467 ft., it flowed 80 bbl. of fluid in 11 hours from perforations at 9,040-45 ft., cut 2 per cent with sediment and 4 per cent with water. Gravity of the oil was 46° and the flow was through ½-in. choke.

Perforations at 8,920-80 ft., with packer at 8,752 ft., yielded 50 bbl. of fluid, on the swab, and was dry. Treated with 500 gal. of acid, it flowed 350,000 cu. ft. of gas daily, with no oil. New shots at 9,001-20 ft., and treated, swabbed 38 bbl. of water in 5 hours, having a trace of oil. Following that it swabbed 5 bbl. of fluid in 3 hours, being 80 per cent water.

Amerada 1-BTB, 26-12s-33e, was drilling at 10,450 ft. A 2-hour test at 10,432-450 ft. recovered 1,450 ft. of water blanket, plus 180 ft. of gas-cut sulfur water and 7,370 ft. of sulfur water.

Amerada 1 Stella Bennett Rose, 35-16s-38e, was drilling below 11,050 ft. in lime. Operators' top on the Wolfcamp was 10,145 ft.

Magnolia Petroleum Co. 1 Markham, 11-9s-35e, east of the Pennsylvanian discovery, 5 miles northwest of the Crossroads field, was drilling in lime at 8,725 ft.

Three-fourths mile north of the discovery of the new Bagley Pennsylvanian and Devonian field, Amerada Petroleum Corp. 1-BTC, SE SW 35-11s-33e, was drilling lime below 7,298 ft.

Humble Oil & Refining Co. 1-X State,

NW NE 31-11s-35e, had top of Mississippian at 12,135 ft. It was drilling ahead at 12,757 ft. with no further tests reported below 12,500-561 ft.

APPALACHIAN FIELD

Snee Stakes Location For New Deep Test

PITTSBURGH.—Rig is being moved to a new location for a deep wildcat test on Chestnut Ridge in Georges Township, Fayette County, Pennsylvania, at William E. Snee et al 1 N. E. Murphy. It is located on the Uniontown Quadrangle approximately 4.4 miles south of Latitude 39 degrees, 50 minutes, and 2.3 miles west of Longitude 79 degrees, 40 minutes.

In South Bend Township, Armstrong County, Victory Development Co. 1 Lee Schaeffer was deepened from 2,945 ft., and resulted in a flow of gas gaging 1,400,000 cu. ft. Total depth is 3,448 ft.

In Grant district, Ritchie County, West Virginia, Davis-Kelly Oil Co. 1 Morella Jackson, elevation 633 ft., topped the Oriskany sand at 5,516 ft. and reported a show of salt water at 5,525 ft. It is drilling at 5,587 ft. A good deep well was noted in Elk district, Kanawha County, when United Fuel Gas Co. 6-6511 M. & N. J. Van Camp, came in for 8,114,000 cu. ft. of gas, natural. A 12-hr. rock pressure was 1,425 psi. Corniferous lime was tapped at 5,032 ft., Oriskany sand 5,163 ft., gas 5,176-88 ft., total depth 5,188 ft. Good shallow sand gas wells were reported: in March Fork district, Raleigh County, Hope Natural Gas Co. 9361 Lucinda E. Walker, 1,372,000 cu. ft. after shot in Ravencliff sand, total depth 1,848 ft.; Trap Hill district, Columbian Carbon Co. 24-1128 Rowland Land Co., 2,157,000 cu. ft. natural, Ravencliff sand, total depth 1,633 ft.; Baileysville district, Wyoming County, United Producing Co. 1-1604 Rogers Theaters, Inc., 1,485,000 cu. ft., after shot, Berea sand, total depth 3,403 ft.; Center district, United's 87-1638 W. M. Ritter Lumber Co., 4,821,000 cu. ft., Maxon sand, total depth 2,273 ft.

OKLAHOMA

Senora Sand Well Opens New Pay Zone at Avoca

WHAT appears to be a new pay zone for the Avoca pool in Pottawatomie County has been found by Flynn Oil Co. in its 1-B Cecil, SW NE NE 6-6n-4e. It is the Senora sand (Pennsylvanian), which was topped at 3,726 ft. and drilled to 3,743 ft. With casing at 3,728 ft., 2 ft. in the sand, testing is now under way. On first test, the well swabbed at the rate of 75 bbl. of oil, plus 1 per cent water, per day. Other production in the pool is from Viola lime.

Mid-Continent Petroleum Co. and Otha Grimes have a gas well in their 1 McCosar, SW SW NE 14-8n-10e, 1½ miles northwest of oil and gas production in the Greasy Creek district, Hughes County. With casing perforated at 3,259½-64 ft. in the Lower Cromwell sand, the well flowed 8,300,000 cu. ft. of gas per day. Prior to running casing, a drill-stem test of the sand, taking in an interval at 3,257-93 ft., resulted in a recovery of 150 ft. of oil in addition to making a substantial gas flow.

In the same county, gas production of the South Wetumka area has been extended southward at Davidor & Davidor 1 Davis, NE NE SE 33-9n-10e, which flowed at the rate of 30,000,000 cu. ft. per day through casing from the Gilcrease sand. Casing was perforated at 2,580-97 ft. (Upper Gilcrease) and 2,686-2,706 ft. (main Gilcrease). The well provides a link in closing the narrow gap between the South Wetumka and North Yeager pools.

W. C. McBride, Inc., is preparing to test its 1 Brady Estate, NE NW NE 9-4n-5e, about 2 miles southeast of the Bebee pool, in Pontotoc County. Good oil showings and saturation were found in the Viola lime. Indications are that another new pool has been found. Viola was topped at 1,933 ft. Hole was drilled to 3,361 ft. in the Arbuckle, topped at 3,343 ft., and then plugged back to 2,064 ft. in the Viola, where 7-in. casing was cemented.

A possible southeastward extension for the Southwest Lone Grove pool in Carter County is indicated at Kirkpatrick & Bale 1 Fish, NE NW SW 9-5s-1w, which recovered 120 ft. of oil-cut mud in a drill-stem test of a sand at a total depth of 4,554 ft. Packer was set at 4,432 ft., taking in 22 ft. of the pay. Casing has been run to 4,278 ft.

Production of the small Munger pool in Oklahoma County has been extended eastward by British American 1 John McVickers, C NE NW 12-12n-2w, which flowed 140 bbl. in 24 hours through 20/64-in. choke on completion. Pay is the Bartlesville sand at 6,043-61 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Seminole County: Evans et al 1 Hober, NE SE NW 12-10n-7e, pumped 21 bbl. of oil per day from Cromwell at 3,623-43 ft., TD 3,648 ft.

Nye 1 Bearhead, NW SE NE 12-10n-7e, flowed 136 bbl. of oil and 1,502,000 cu. ft. of gas from Cromwell at 3,608-26 ft., TD 3,628 ft.

Washita County: Constantine 1 Lambert, S 2 SW SW 18-10n-20w, flowed 1,198 bbl. of 52°-gravity distillate and 2,800,000 cu. ft. of gas from conglomerate at 9,849-54 ft., GOR 2,340-1, TD 10,417 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Turner 1 Smith est., NW SE NW 28-4s-1w, dry, TD 8,043 ft.

Comanche County: Sheridan 1 Goodin, SW NW NW 25-1n-12w, dry, TD 1,658 ft.

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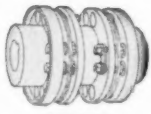
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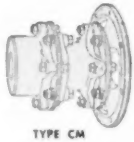
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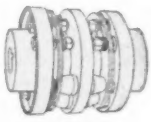
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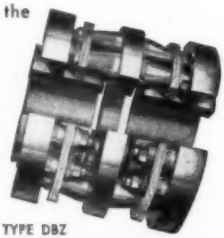
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Cotton County: Blackwell Oil & Gas Co. 1 Alexander, NE SW NE 27-3s-12w, dry, TD 1,734 ft., sand 930 ft. and 1,236 ft., conglomerate and sand 1,440 ft. and 1,520 ft., sand 1,640 ft.

Creek County: McIntyre 1 Holcomb "A," SW NW SE 19-18n-8e, dry, TD 3,000 ft., Bartlesville 2,930 ft., second Bartlesville 2,935 ft., third Bartlesville 2,965 ft.

Garvin County: Davenport 1 Keele, NE SW NE 22-1n-1w, dry, TD 1,645 ft.

Brown & Moody 1 Neal, NW SW NE 8-2n-2w, dry, TD 7,108 ft., Checkerboard 6,300 ft., first Deese sand 6,424 ft., second Deese sand 6,556 ft., third Deese sand 6,844 ft., fourth Deese sand 6,979 ft., basal Pennsylvanian-Mississippian Caney 7,092 ft.

Grady County: Skelly 1 Waskey, NE NE NE 24-3n-8w, dry, TD 12,392 ft., Cisco 5,662 ft., Ostracod 7,678 ft., Medrano sand 9,500 ft., Melton sand 10,345 ft., Deese 10,812 ft., Glover sand 11,148 ft., Charleston sand 11,535 ft., Pooler sand 12,025 ft.

Grant County: Dunham et al 1 Markham est., NW NW NW 8-28n-3w, dry, TD 5,056 ft., Tonkawa 3,333 ft., Layton 3,738 ft., Oswego 4,100 ft., Mississippi chat 4,560 ft., Mississippi lime 4,610 ft., Woodford 4,975 ft., dolomite 5,025 ft., Wilcox 5,050 ft.

Jefferson County: Wilcox 1 D. Stone, NW NW NE 20-4s-7w, dry, TD 2,020 ft., sand 1,695 ft. and 1,800 ft., lime 1,815 ft., sand 1,895 ft., 1,910 ft., and 1,965 ft.

Gaskill 1 Hight, NW NE SW 7-4s-8w, dry, TD 2,405 ft.

Wilcox 1 May Stone, NE NE SW 12-4s-8w, dry, TD 2,027 ft., sand 1,475 ft., and 1,820 ft.

Cities Service 1 Conley, SE NE NE 12-6s-7w, dry, TD 3,647 ft., Arbuckle 3,547 ft.

Kiowa County: Sellers & Ewing 1 Lewis, NE NE NE 11-6n-14w, dry, TD 640 ft.

Pottawatomie County: Palmer et al 1 State, SW SE NW 30-10n-2e, dry, TD 6,315 ft., Pawhuska 2,383 ft., Avant 3,744 ft., Belle City 3,840 ft., Hogshooter 4,280 ft., Checkerboard 4,492 ft., Red Fork 5,450 ft., Woodford 5,592 ft., Hunton 5,608 ft., Sylvan 5,878 ft., Viola 5,978 ft., Wilcox 6,163 ft., second Wilcox 6,286 ft.

Altus 1 Day, NW SW NE 28-10n-4e, dry, TD 5,361 ft., Avant 2,285 ft., Dewey 2,355 ft., upper Hogshooter 2,780 ft., lower Hogshooter 2,855 ft., Checkerboard shale 3,105 ft., Checkerboard lime 3,125 ft., upper Wewoka 3,305 ft., lower Wewoka 3,425 ft., Oswego 3,595 ft., Inola 4,405 ft., Bartlesville 4,425 ft., lime 4,510 ft., basal Pennsylvanian-Mississippian Caney 4,595 ft., Mayes 4,765 ft., Woodford 4,838 ft., Hunton 4,971 ft., Sylvan 5,021 ft., Viola 5,120 ft., Wilcox 5,228 ft., second Wilcox 5,346 ft.

Seminole County: K. S. & P. Prod. 1 Leachman, SE SW SW 35-10n-6e, dry, TD 2,780 ft.

Stephens County: Batson 1 Johnson, SW NW NW 35-2s-7w, dry, TD 3,064 ft.

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OHIO, KENTUCKY

Knox County Gets Two Good Oilers

COLUMBUS. — Shorts Brothers 3 A. A. Gardner, Lot 16, Howard Township, Knox County, was drilled in with a good showing of oil in the first Clinton at 2,612-44 ft. and flowed 60 bbl. in 24 hours after shot. In Jefferson Township, Knox County, C. A. Davis 1 Steiner, Section 21, filled up 300 ft. natural, and made 40 bbl. in 24 hours after shot.

E. A. Fierbaugh et al 1 J. W. Kinsell, Lot 4, Greenwich Township, Huron County, a wildcat, failed to find any Clinton sand and have plugged back to test a small showing of oil and gas in the Newburg sand.

John Galey et al 1 E. W. Hatfield, Lot 19, Charlestown Township, Portage County, a north offset to a small producer in a wildcat area, found the white Clinton at 4,349-90 ft. with 100,000 cu. ft. natural which was shut in on the casing at 238,000 cu. ft. 30 minutes after shot. The rock pressure was 900 psi. Another attempt to find production in the area will be made by Lyons & Creese on A. J. Fox in Lot 6, Rootstown Township, 1¼ miles to the southwest.

EASTERN KENTUCKY

ASHLAND. — In Pike County, some 15 miles southeast of Pikeville, the county seat, Kentucky West Virginia Gas Co. completed 5,787 Elisha Branham for 10 bbl. of oil per day from the Big lime at a total depth of 2,628 ft. This is in an area which normally produces gas from the Devonian black shale and is part of the Big Sandy gas field. In the same field, the company also completed 5,875 Richard Cains for 1,545,000 cu. ft. of gas daily from the Big lime and the Devonian black shale.

In Fleming County, Walter Kline et al have finally resumed drilling on 1 James Bashford, 20-V-70, a rank wildcat test for the southern part of the county. Drilling is now progressing at 1,330 ft.

WESTERN KENTUCKY

OWENSBORO. — Another new pool for Daviess County appears to have been found

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by Wasson Oil Co. in its 1 Goodwin, C N½ SW NE 17-N-28. The well, 2 miles east of the Guffie townsite and about the same distance southeast of production in the East Guffie pool, and just north of the McLean County line, swabbed 1 bbl. of oil per hour after a 2,000-gal. acid treatment when testing McClosky lime at 1,891-94½ ft. Previously, when plug was drilled out, the hole filled 750 ft. with oil in the first 30 hours.

O. D. Vickers and Shaw Drilling Co. 1 Bell, 9-P-27, north of the Birk City pool, Daviess County, has been completed as a 17-bbl. pumper from Jackson sand at 1,949-1,500 ft. On the west side of the same pool, near the central portion, in Henderson County, production also has been extended by W. E. Hupp and W. Chenault and associates in their 1 Spencer, 17-P-27, completed as a 15-bbl. pumper in Tar Springs sand at 1,266-72 ft.

Ryan Oil Co. and George & Wrather and associates 1 Charles Greathouse Heirs, SE cor. 24-Q-20, which opens a new producing area about 2½ miles southeast of the Powells Lake pool, Union County, and also a new pay zone for the area, swabbed 7 bbl. of oil, with 11 bbl. of water, per day on initial tests of Cypress sand at 2,243-51 ft. Sand was shot with 20 qt. In a previously reported drill-stem test of the zone, it recovered 210 ft. of clean oil and 30 ft. of oil-cut mud.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Henderson County: W. E. Hupp et al 1 Spencer, SE NW SE 17-P-27, IP 16 bbl., Tar Springs 1,266-72 ft., TD 1,272 ft.

WESTERN KENTUCKY WILDCAT FAILURE

Hancock County: Basin Drilling Co. et al 1 Elmina Temple, SW NE SE 25-P-33, dry, TD 562 ft.

INDIANA

EVANSVILLE—Discovery of three new pools, one each in Gibson, Knox and Posey counties, revived interest in Indiana exploration the past week. In Gibson County, Ashland Oil & Refining Co., John Buchanan and C. E. O'Neal 1 Barrett, SW SE NE 7-3s-11e, ½ mile east of the Owensville townsite and about 1¼ mile northeast of the Mounts pool, nearest production, swabbed 80 bbl. oil per day from Cypress sand at 2,099-2,111 ft. and is being put on the pump.

In Knox County, Winmar Oil Co. 1 Parkinson, NE NE NW 11-1s-12w, about 1½ miles east of production of the Mt. Carmel pool, across the Wabash River in Illinois, and about the same distance north of the Mt. Carmel East pool, swabbed at the rate of 200 bbl. of oil natural from O'Hara lime at 2,262-69 ft. with testing still under way.

In Posey County, George & Wrather Drilling Co., Aurora Gasoline Co. and Barclay Oil Co. 1 Tension, SW SE NW 20-7s-12w, 6 miles southeast of Mt. Vernon and 1½ miles east of the LaMott pool, recovered 110 ft. of clean oil and 10 ft. of oil-cut mud in a drill-stem test of Hardinsburg sand at 2,070-77 ft. and has run 5½-in. casing to 2,069 ft. preparatory to completing. It also encountered saturation in the Waltersburg at 1,840-48 ft., which, on a drill-stem test, yielded 40 ft. of clean oil and 60 ft. of oil-cut mud.

Carter Oil Co. 1 Hastings, SE NW NE 11-8s-14w, westward extension for the steadily increasing Spencer pool, Posey County, flowed at the rate of 2,223 bbl. of oil per day on completion, and is the best well yet completed in the area. Production is from McClosky lime at 2,850-56 ft., 2,868-78 ft., and 2,892-96 ft.

Winmar Oil Co. 1 Henry White, SW NE SW 29-1s-10w, which proves a new area 1 mile southeast of production in the Patoka East pool, Gibson County, has been completed as a pumper from Cypress sand at 1,673-90 ft. It made 58 bbl. of oil and 7 bbl. of water per day initially.

INDIANA SUCCESSFUL WILDCAT

Gibson County: Winmar Oil Co. 1 Henry White, SW NE NW 29-1s-10w, IP 46 bbl., Cypress 1,674-84 ft., TD 1,688 ft.

INDIANA WILDCAT FAILURES

Gibson County: George Engle 1 Anthis, SW NW NW 14-1s-11w, dry, TD 2,150 ft.

Knox County: J. B. & L. Drilling Co. 1 Shepard, SW SE SE 13-5n-10w, dry, TD 1,522 ft.

Sullivan County: Walter Duncan 1 Chaney, SW SE NE 28-8n-9w, dry, TD 2,490 ft.

Vigo County: A. J. Slagter, Jr., 1 Blake, SW SW NE 1-10n-9w, dry, TD 2,096 ft.

H. P. Smith and G. H. Froderman 1 Zora Temple, NW NW NW 6-12n-13w, dry, TD 1,814 ft.

N. CENTRAL TEXAS

Stephens County Gets 3 Key Wildcat Locations

WICHITA FALLS—Two 5,000-ft. Ellenburger exploratory tests, plus one outpost to the Crystal field, all in Stephens County, were announced last week. Fourteen miles south of Caddo, Star Oil Co., Inc., 1 Ed Ford I, 3,050 ft. from north and 1,200 ft. from east lines of 1-1-SP Survey, A-207, will drill to 5,000 ft. with rotary, unless shallower production is developed.

South of the Throckmorton County line, and 14 miles north of Breckenridge, Mudge Oil Co. has made location for its 1-A Ross Sloan, 2,013 ft. from north and 153 ft. from west lines of TE&L Survey 1,169.

The outpost test to the Crystal Falls field, 1 mile west of the town of Crystal Falls, is Texas Pacific Coal & Oil Co. 1-B S. P. Robertson Farm, 341 ft. from north and 2,124 ft. from east lines, J. J. Metcalf Survey. Drilling permit is to 4,600 ft., with rotary.

Stonewall County had a new Ellenburger wildcat under way at Barnsdall Oil Co. 1 Sloane Callaway, in 62-F-H&TC, 14½ miles north of aspermont. It was drilling ahead below 4,551 ft. in broken sand and shale after a drill-stem test at 4,172-4,206 ft., open 1 hour, recovered 2,500 ft. of salt water. Scheduled depth was 6,800 ft.

An Ellenburger test 2½ miles northeast of Patosi in Taylor County was drilling below 4,937 ft. in lime. It is Royal Oil & Gas Corp. 1 Charles Yost, 8-23-SPRR. Top of the Canyon was 3,030 ft. on an elevation of 1,910 ft.

Two miles southwest of Merkel, Sojourner Drilling Co. 1 H. E. Stubbs, 5-18-T&P, was a prospective Reef producer. Top of the lime was logged at 3,432 ft., and drilled to 3,461 ft. Operators prepared to squeeze perforations at 3,450-56 ft., after the well developed a flow of 55 bbl. of oil and 177 bbl. of water in 24 hours.

Skelly Oil Co. 1 E. A. Ater, Nolan County Ellenburger test 3½ miles southwest of Rosco, prepared to test on the pump, as salt water from the lower part of the Ellenburger was apparently shut off. In 24 hours of swabbing on new perforations at 7,097-7,118 ft., recovery was 285 ft. of oil and 10 bbl. of water. During the last hour the recovery was 15 bbl. of oil.

American Liberty Oil Co. 1 J. S. Criswell, Section 97, T&NO Survey, Baylor County prospect, was delayed by three strands of pipe dropped in the hole. It has been estimated good for 20 bbl. of oil a day from the Caddo, topped at 5,162 ft., and was waiting on pumping equipment.

In Cooke County, Kay Kimbell 1 R. M. Crump, Finch Survey A-382, prospective 1-mile northeast extension to the Woodbine field, had total depth at 4,228 ft., and prepared to drill-stem test from 4,222-28 ft. The well's second Strawn test, from 4,217-23 ft., and open 60 minutes, recovered 720 ft. of gas, 20 ft. of oil, plus 60 ft. of oil-cut mud. Bottom-hole pressure was 1,130 psi. in 15 minutes.

Kay Kimbell 1 W. E. Winger, Section 84, Fannin CSL, 3 miles northeast of Callisburg, Cooke County, was reported pumping 216 bbl. of oil a day from the Strawn, topped around 5,850 ft. Total depth was 5,867 ft. First drill-stem test was from 5,861-67 ft., which recovered 3,700 ft. of gas, 180 ft. of oil and 60 ft. of oil-cut mud in 30 minutes. Location is 2 miles southeast of the Walnut Bend field, which produces from the Strawn. The well was originally scheduled to 6,000 ft. to test the Ellenburger.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Cooke County: Kay Kimball 1 W. E. Winger, Blk. 84, Fannin CSL, 2 mi. W Balm, pumped 210 bbl. 34°-gravity oil a day, pay 5,854-67 ft., TD.

Comanche County: Sohio Petroleum Co. 1 W. D. Chapman, Sec. 43, ETRR Sur., 2½ mi. N Sidney, initial potential 9,000,000-cu. ft. of gas daily, Marble Falls 2,160 ft., SIP 930 psi., TD 2,900 ft., PB 2,285 ft.

Sohio 1 J. W. Ward, Blk. 25, Lampasas CSL, 2½ mi. NW Sidney, flowed 103 bbl. 40°-gravity oil in 7 h., ¾-in. choke, Mississippian 2,525-68 ft. TD, TP 20 psi., CP 200 psi., GOR 250 cu. ft.

Eastland County: J. M. O'Melveny 1 N. T. Mulloy, Sec. 2, Wm. Arenbeck Sur., 7 mi. NW Rising Star, pumped 2 bbl. 40°-gravity oil a day, Marble Falls, 3,024 ft., nitro shot 3,024-40 ft., TD 3,714 ft., elev. 1,649 ft.

Haskell County: Stanolind Oil & Gas Co. 1 John M. Pace, T. D. Owings Sur. 111, 3¾ mi. SE Haskell, flowed 352 bbl. 37°-gravity oil a day, 10/64-in. choke, reef limestone 3,610-15 ft., TD 3,624 ft., elev. 1,536 ft., CP 55 psi.

Jack County: Jones-Simpson Drilling Co. 1 Lydia Chipman, R. Barr Sur., A-62, 3 mi. E Cundiff, flowed 16½ bbl. 43°-gravity oil a day, conglomerate 5,648 ft., 3 16-in. choke, TP 80 psi., GOR 550 cu. ft., TD 5,908 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: H. L. Brinson 1 Olin Calvin, H. Grooms Sur., A-155, 1½ mi. SE Anarene, dry, TD 1,037 ft.

Fain & McGaha 1 C. E. Reams, Blk. 103, J. W. Harris Subd., Club Ranch, 3½ mi. NW Archer City, dry, TD 4,383 ft.

W. A. Loftin 1 W. J. McMurty, M. Galan Sur., A-137, 9 mi. SW Windthorst, dry, TD 835 ft.

W. A. Loftin 1 L. A. Snider, SA&MG Sur., A-444, 8 mi. S Windthorst, dry, TD 820 ft.

Mul-Berry Oil Co. 1 W. O. Hayter, Sec. 2415, TE&L Sur., 3 mi. SE Megargel, dry, TD 1,485 ft.

Needl & Hood Drilling Co. 1 E. E. Threet, M. Pickens Sur., A-341, 4 mi. S Archer City, dry, TD 3,904 ft.

Joe H. Staley 1 Wallace Estill, Sec. 41, BBB&C Sur., 6 mi. N Megargel, dry, TD 1,567 ft., Gunsight 1,486-91 ft.

W-M Co. 1 E. D. White, Blk. 3, Meade L. M. Subd., 1½ mi. E Megargel, dry, TD 1,429 ft.

Brown County: C. F. Peffley 1 C. C. Moore, Blk. 11, H. P. Brewster Sur. 790, A-48, 3½ mi. SW Rising Star, dry, TD 1,278 ft.

Callahan County: Lebus & Sinex Drilling Co. 1 T. M. Allen, Sec. 19, BBB&C Sur., A-72, 6 mi. S Clyde, dry, TD 1,355 ft.

Clay County: Fain & McGaha 1 Erma Shaver, Blk. 91, J. H. Belcher Subd., 2 mi. SW Deer Creek, dry, TD 5,710 ft.

Cooke County: George Keath, Jr., 1 J. N. Whaley, B. J. Thompson Sur., A-1006, 5 mi. SW Gainesville, dry, TD 2,178 ft., Ellenburger 2,128 ft.

Shackelford County: Jack H. Moore 1 Dawson & Conway, Sec. 194, ETRR Sur., 5 mi. E Lueders, dry, TD 1,608 ft.

Taylor County: L. M. Lockhart 1 John L. Camp, 44-1-SPRR Sur., 2 mi. SE Buffalo Gap, dry, TD 5,103 ft., Flippen 2,320 ft., Swastika 2,663 ft., Palo Pinto 3,857 ft., Ellenburger 4,935 ft., elev. 2,933 ft.

C. B. Simmons 1 J. D. Porter, Blk. 8, League 148, Grimes CSL, 2 mi. N Merkel, dry, TD 3,110 ft., Flippen 2,655 ft., Hope 2,805 ft., Swastika 3,055 ft., elev. 1,816 ft.

Sohio Petroleum Co. 1 Sears Ranch, 223-64-H&TC, 5 mi. NE Shep, dry, TD 4,842 ft., Fry 3,115 ft., Flippen 3,164 ft., Reef 4,045 ft., Strawn 4,809 ft., elev. 2,315 ft.

J. Ralph Stewart 1 George L. Miller, 50-

19-T&P, 4 mi. W Merkel, dry, TD 2,572 ft., Noodle 2,570 ft., had light oil show.

Wichita County: Fortex Oil Corp. 1 Annie Powell, Blk. 261, Waggoner County Subd., 8 mi. NE Electra, dry, TD 2,682 ft.

Frank Wood 1 Joe Slama, Red River Valley Subd., 1 mi. SE Burkburnett, dry, TD 1,891 ft., sand with oil show 1,554-61 ft.

Young County: Star Oil Co. 1 DeWitt McClatchey, Sec. 171, TE&L Sur., A-418, 1½ mi. SW Olney, dry, TD 5,111 ft., Caddo 4,355 ft., Mississippian 4,994 ft.

ROCKY MOUNTAIN

Superior's Deep Test Looks Disappointing

DENVER.—Results of testing in the Superior Oil Co. 1 Unit, SW NE SW 27-27n-103w, Pacific Creek, Sublette County, Wyoming, the world's deepest well, have been disappointing. Only gas cut mud has been recovered on drill-stem tests to the present depth of 20,521 ft. The well topped Frontier at 19,720 ft. and was still in that formation at total depth. On drill-stem tests in the Frontier the well made only a slight amount of gas cut mud, and subsequent tests through casing perforations opposite the Mesa Verde formation, below 11,660 it. also showed gas cut mud. Temperatures and pressures were extremely high on the well. The operator is continuing to test the well, with little indication that it will be a commercial producer to the present depth. There is some report that the well may be drilled from 800 to 1,000 ft. deeper for a test of the Dakota, but this report is not confirmed by Superior. The well was drilled following seismic work by Superior throughout the northeastern side of the Green River basin.

Two wells in the Fiddler Creek-Skull Creek area of Weston County, Wyoming, are of interest this week. The Mule Creek Oil Co.-H & H Drilling Co. 1 Martin-Conley, NE SE SE 25-46n-66w, 3 miles west of production in the Fiddler Creek field, logged 15 ft. of well saturated sand in the Newcastle between 5,684-5,725 ft., total depth. Casing has been cemented on top of the sand and the operator plans a test in the near future. Estimates of production based on electric log surveys have been high, but no tests have been reported on the wildcat. East of the Skull Creek field Parker-Simmons Drilling Co. have a wild well at 4 Govt.-Wright, NE NE 8-44n-61w, after the well blew out with an estimated volume of 50,000,000 cu. ft. of gas daily. Top of Newcastle sand was logged at 2,291 ft. with 9 ft. of sand having no shows. The operator drilled to 3,050 ft. and in coming out of the hole the well started flowing mud and gas. The large gas flow is believed to be coming from a fractured zone at the total depth, and Newcastle zone does not produce gas in the rest of the field. A directional hole is planned to kill the well if the gas volume does not decrease. No fire has started, but extreme caution is being used throughout the Skull Creek-Mush Creek area.

Added knowledge of the interesting play throughout southwestern Nebraska was obtained this week in two wells. Roberts Bros. et al plugged their 1 Thompson, NW NW SE 18-15n-48w, Cheyenne County, 2 miles southeast of The Ohio Oil Co.'s Muddy sand discovery. The Roberts test went to 4,462 ft., total depth, with Muddy topped at 4,431 ft. On drill-stem test in that zone the well made 3,100 ft. of salt water in 30 minutes. The operator plans another test in Section 25-14n-50w, northwest of the town of Sidney, in the near future. Ohio is coring below 4,800 ft. at its 1 Knievel, NE SE SE 2-15n-49w, 1,320 ft. north of its discovery. This well found 41 ft. of saturated sand in the Muddy but tests in two lower sands showed water. It is now reported the well will be drilled through the entire Dakota series prior to testing in the Muddy for completion. Ideal Drilling Co. is nearing the Muddy pay at 1 Bayer, NE NE SE 20-16n-49w, 3 miles northwest of the discovery well.

General Petroleum Corp. is swabbing fluid, only a small amount of which is oil, from its 37-X-24-G, NW SE SW 24-47n-92w, in the South Frisby area, Washakie County, Wyoming. The well topped Phosphoria at 10,580 ft. and acidized the zone with 3,000 and 5,000 gal. The Phosphoria was hard and tight and the operator may abandon the well if production does not increase. This unit adjoins on the southwest Pure Oil Co.'s Worland Unit, which produces from Phosphoria, and location was made following seismic work in the area by General Petroleum.

New locations.—There were 35 new locations made during the week, with 19 in Wyoming, 11 in Montana, 4 in Colorado and 1 in northern New Mexico. In Wyoming American Liberty Oil Co. of Dallas made location for 1 Fee, SE SE SE 18-42n-78w, ½ mile southwest of production in the Sussex field. This is the company's second wildcat in that area. Bridwell Oil Co. of Wichita Falls and Seaboard Oil Co. are moving in materials for a 10,500-ft. test on the Meadow prospect in the SW SE 4-17n-67w, Laramie County. G. G. Travis of Tulsa spudded a Devonian test in the Ramshorn area, Teton County, in the C SE SW 5-43n-114w. This well is on a farmout from Sinclair Oil & Gas Co. Three wildcats were announced for the northeastern Colorado area, following discovery of oil across the line in southwestern Nebraska. Murphy et al of Brush made location with E. K. Carey Drilling Co. as contractor for a 6,000-ft. Dakota test in the NW SE 6-2n-56w, in the Fort Morgan area, Morgan County. Canfield Drilling Co. is drilling at 1 Whittenton, NE NW NE 24-4n-58w, in the same area. Ambassador Oil Co. of Fort Worth has spudded a wildcat in the NW¼ 24-4s-48w, Yuma County, with the well a tight hole.

WILDCAT FAILURES IN WYOMING

Lightning Creek, Niobrara County: Atlantic Refining Co. 1 State 8, C SW NE 8-34n-65w, 865 TD, plugged and abandoned, Mowry 423, Muddy 732, Thermopolis 788.

Chugwater area, Platte County: Holcomb & Parrent 1 Morrison, SE NE SE 23-20n-69w, 430 TD, temporarily abandoned.

WILDCAT FAILURE IN COLORADO

Ojo, Huerfano County.—H. L. Russell et al 1 Campbell, NE NE NE 10-29s-69w, 1,405 TD, suspended indefinitely.

WILDCAT FAILURE IN MONTANA

Coyote Springs, Glacier County—Union Oil Co. of Calif. 1 Tribal, NW SE 31-36n-6w, 3,414 TD, plugged and abandoned, Colorado 760, Blackleaf 1,750 Kootenai 2,540, Cut Bank 3,125, Ellis 3,155, Basal Ellis 3,323, Madison 3,328.

WILDCAT SUCCESS IN UTAH

Upper Valley, Garfield County: The California Co. 1 Unit, C SW NW 12-36s-1e, 8,857 TD, pumped 136 bbl. oil, 714 water in 23½ hrs., Dakota 715, Morrison 837(?), Summerville 970, Entrada 1,087, Carmel 2,068, Navajo 2,465, Todilto 3,880, Wingate 4,031, Chinle 4,293, Shinarump 5,153, Moenkopi 5,251, Kaibab 6,040, Coconino 6,200, Rico Supai 8,033(?) Hermosa 8,396 (?), Lime pay 8,777.

WILDCAT FAILURE IN UTAH

East Ashley Valley, Uintah County: H. D. Moore et al 1 Govt., SW SE NW 18-5s-23e, 4,439 TD, plugged and abandoned, Frontier 923, Dakota 1,245, Morrison 1,307, Entrada 2,315, Phosphoria 4,269.

WILDCAT SUCCESS IN NORTHERN NEW MEXICO

Gallivan area, Rio Arriba County: Jim Gardner et al 1 Dunham, C SW NW 14-25n-2w, 3,492 TD, completed as shut-in

(Continued on page 115)

ILLINOIS

Madison County Wildcat May Open Devonian Pool

MATTOON.—A rank wildcat in Madison County on the extreme east side of the Illinois basin in the western part of the state is showing for a small producer. Testing the Devonian at 2,020-40 ft., Dale Hopkins 1 Klaus, NW NE NW 2-4n-5w, swabbed 1 bbl. of oil and 2 bbl. of water per hour after a 2,000-gal. acid treatment. The discovery is 8 miles east of the Marine pool, where production is obtained both in the Devonian and Silurian.

Although a "tight" hole, Carter Oil Co. 1 Hughes, SE SE NE 8-8s-8e, southwest of the Omaha pool, in Gallatin County, is reported to have recovered 650 ft. of oil and oil-cut mud in a drill-stem test of Aux Vases sand at 2,715-40 ft., and is believed to have found a new producing area.

Miracle-Steber 1 Stella Jack, SW SW NW 7-1n-11e, which opens a new producing area about a mile southeast of the Maple Grove East pool in Edwards County, has been completed on the pump making 165 bbl. of oil and 40 bbl. of water per day from McClosky lime at 3,232-47 ft. with bottom of hole at 3,280 ft.

Extensions of producing areas of the Benoist, Rosiclare and Devonian zones were effected by completions the last week in the active Assumption North pool, Christian County. In the south part, National Associated Petroleum Co. and Continental Oil Co. 11-A Lawrence, SE SE SW 9-13n-1e, extended Benoist production ¼ mile west as a 30-bbl. well at 1,055-66 ft., No. 31 Lawrence, NE SW SW 3-13n-1e, extended Rosiclare production on the north end ¼ mile east, making 151 bbl. per day at 1,174-81 ft. Devonian production on the south end was extended ¼ mile southeastward by 1 Winslow, NW NW NW 15-13n-1e, pumping 128 bbl. per day at 2,300-11 ft.

ILLINOIS SUCCESSFUL WILDCATS

Edwards County: Miracle et al 1 Stella Jack, SW SW NW 7-1n-11e, IP 260 bbl., Rosiclare 3,218-26 ft., TD 3,282 ft.

Franklin County: Producers Pipe Line Co. 1 King, NW NE SW 16-5s-4e, IP 254 bbl., Lower O'Hara 3,056-62 ft., TD 3,062 ft.

ILLINOIS WILDCAT FAILURES

Christian County: Dell Carroll 1 Baird, NW NW SE 33-14n-1e, dry, TD 1,300 ft.

Clark County: A. J. Hahn 1 Smith, SE SE NW 3-9n-14w, dry, TD 717 ft.

Clinton County: E. A. Obering 1 Bond Estate, NW SE NW 6-2n-2w, dry, TD 1,404 ft.

Edgar County: J. R. Shake 1 Abner Wood, NW NE NW 28-14n-13w, dry, TD 581 ft.
Golden McNary 1 Culbertson, SE NW SW 11-14n-14w, dry, TD 565 ft.

Effingham County: G. B. Stephens 1 Owenbeck, SE SE NW 31-8n-7e, dry, TD 2,640 ft.

Franklin County: George & Wrather 1 Webb, SW SW NW 19-5s-4e, dry, TD 3,229 ft.
W. G. Fortner et al 1 Kelly, SE SE NW 8-7s-1e, dry, TD 2,855 ft.

Gallatin County: Oil Management 1-A Doane, SE SE NE 6-9s-9e, dry, TD 2,310 ft.

Hamilton County: George & Wrather 1 Dailey, SE SE SW 27-4s-6e, dry, TD 3,515 ft.

Marion County: E. G. Welker 1 Merten, NE SE NE 29-3n-1e, dry, TD 1,753 ft.

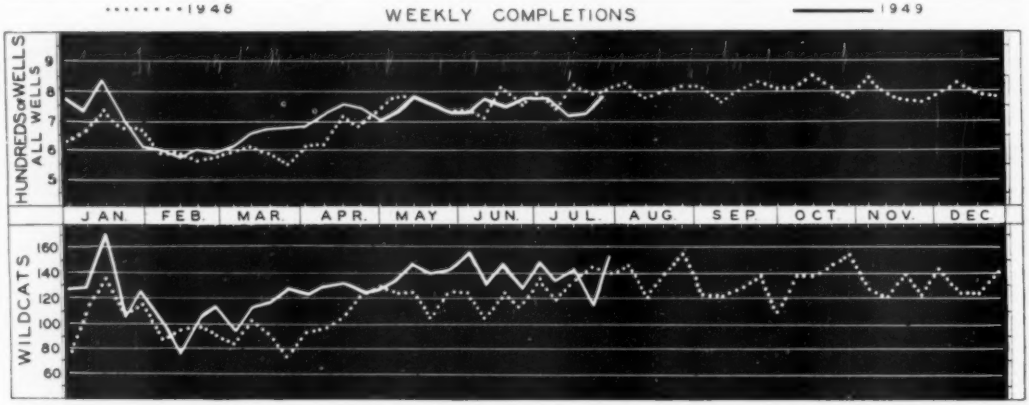
Wayne County: Floyd & Hinson 1 Acola, NE NE SW 31-2s-6e, dry, TD 3,370 ft.
Illinois Mid Continent Co. and Aurora Gasoline Co. 1 Davis, NE NE SW 18-3s-5e, dry, TD 3,246 ft.

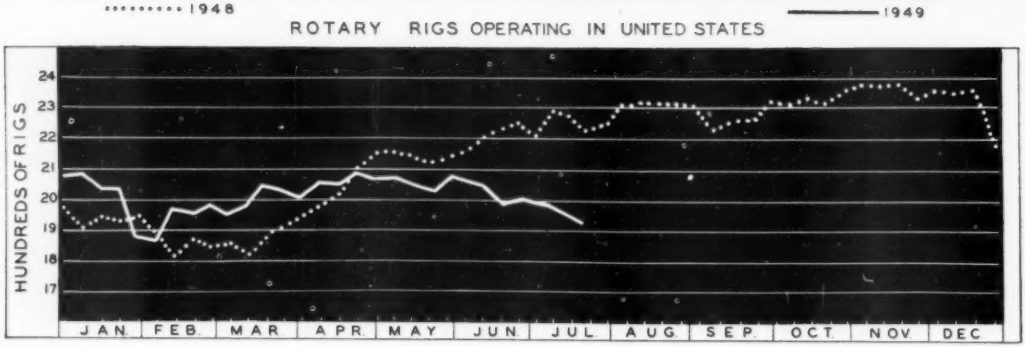
Williamson County: Ross Bartmess 1 Norris-Weisbrogt Comm., NW SE NW 7-9s-3e, dry, TD 2,559 ft.

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED JULY 30, 1949

	Total of all wells					30 WK.		Wildcat completions and discoveries									
													Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	15	8	0	*7	16,090	611	365	0	0	0	0	0	0	0	0	0	0
Pennsylvania	19	7	2	†10	39,541	884	1,483	0	0	0	0	0	0	0	3	1	4
West Virginia	11	2	8	1	31,467	276	448	0	0	0	0	0	1	0	6	6	13
Ohio	19	9	2	8	35,495	595	748	0	0	0	0	0	1	0	2	21	24
Indiana	30	13	0	17	51,238	715	576	1	0	0	5	6	13	0	0	137	150
Kentucky	22	8	9	5	35,138	501	783	1	0	0	1	2	13	0	0	38	51
Illinois	73	40	0	33	180,558	1,397	1,253	2	0	0	14	16	35	0	1	230	266
Michigan	26	13	0	‡13	56,967	550	429	0	0	0	5	5	19	0	1	170	190
Kansas	75	35	9	§31	226,016	1,778	1,709	1	0	0	8	9	36	0	4	223	263
Neb., Mo., Iowa	0	0	0	0	0	14	2	0	0	0	0	0	1	0	0	9	10
Oklahoma	96	53	0	¶43	364,293	2,411	2,261	2	1	0	17	20	86	10	10	355	461
Texas	234	145	11	78	1,062,816	7,624	6,508	11	0	5	41	57	232	32	71	1,315	1,650
N. Central (Dist. 7-B & 9)	90	51	2	**37	250,003	2,517	2,024	5	0	1	22	28	101	0	11	521	633
West (Dist. 7-C & 8)	58	53	0	5	298,964	1,818	1,779	2	0	0	3	5	32	0	3	151	186
Panhandle (Dist. 10)	5	5	0	0	15,606	605	331	0	0	0	0	0	1	0	0	3	4
Eastern (Dist. 5, 6, & 6-P)	8	8	0	0	34,285	378	296	1	0	0	0	1	6	2	3	79	90
Gulf Coast (Dist. 2 & 3)	35	14	2	19	284,840	1,135	1,041	1	0	0	7	8	50	24	30	225	329
Southwest (Dist. 1 & 4)	38	14	7	17	179,118	1,171	1,037	2	0	4	9	15	42	6	24	336	408
Louisiana	76	40	11	25	416,822	1,228	1,237	2	0	1	9	12	35	10	4	122	171
Northern	47	24	9	14	140,185	678	819	1	0	0	5	6	3	2	0	53	58
Southern	29	16	2	11	276,637	550	418	1	0	1	4	6	32	8	4	69	113
Arkansas	9	4	0	5	34,744	178	156	0	0	0	3	3	3	0	0	35	38
Mississippi	8	5	1	2	56,736	202	221	0	0	0	1	1	4	0	1	59	64
Southeastern States	1	0	0	1	3,497	27	28	0	0	0	1	1	1	0	0	24	25
Montana	4	0	0	4	13,074	132	143	0	0	0	1	1	2	0	2	19	23
Wyoming	9	3	0	6	24,805	337	272	0	0	0	5	5	16	0	0	62	78
Colorado-Utah	8	3	2	3	23,562	78	139	1	0	0	2	3	2	0	0	30	32
New Mexico	8	5	1	2	26,076	301	346	1	0	1	0	2	8	0	1	30	39
California	46	30	1	15	195,592	1,538	1,625	0	0	0	11	11	26	0	6	260	292
Total United States	789	423	57	309	2,894,527	21,377	20,832	22	1	7	124	154	534	52	112	3,146	3,844
Total previous week	729	413	55	261	2,483,443	20,588	20,025	16	2	5	91	114	512	51	105	3,022	3,690
Total July 31, 1948	807	451	68	288	2,859,224			31	1	5	103	140	490	42	154	2,735	3,421

Service wells included: *7, †8, ‡4, §2, ¶1. Incl. 3 So. Dak. at 9,574 ft.





DAILY AVERAGE PRODUCTION FOR WEEK

	July 30 crude oil	B. of M. July demand	July 23 crude oil
Alabama	1,200	1,350	1,200
Arkansas	72,550	87,000	72,650
California	904,400	928,000	908,100
Colorado	65,000	65,000	65,000
Eastern	59,000	60,850	62,000
Florida	1,350	1,400	1,400
Illinois	178,800	170,000	176,200
Indiana	28,500	24,000	29,700
Kansas	243,650	302,000	258,600
Kentucky	23,400	21,000	23,200
Louisiana	473,750	510,000	473,950
North Louisiana	105,700		105,900
South Louisiana	368,050		368,050
Michigan	49,000	46,000	38,500
Mississippi	97,100	109,000	97,650
Montana	27,800	24,000	27,800
Nebraska	600	700	600
New Mexico	136,300	131,000	136,300
Oklahoma	375,500	410,000	377,350
Texas	1,805,000	2,150,000	1,805,000
Dist. 1 (Southwest)	25,570		25,570
Dist. 2 (Southwest)	108,825		108,825
Dist. 4 (Southwest)	174,675		174,675
Dist. 3 (Gulf Coast)	334,905		334,905
Dist. 5 (Eastern)	32,150		32,150
Dist. 6 (Eastern)	78,700		78,700
East Texas field	221,000		221,000
Dist. 7-C (West)	41,425		41,425
Dist. 8 (West)	499,375		499,375
Dist. 7-B (W. Central)	57,400		57,400
Dist. 9 (N. Central)	137,175		137,175
Dist. 10 (Panhandle)	93,800		93,800
Utah	1,000	700	1,000
Wyoming	129,500	118,000	129,500
Total United States	*4,673,400	5,160,000	4,685,700
Change from previous week, dn.	12,300		
Canada	59,120		57,415

Total U. S. production January 1-July 30 †1,080,903,275 bbl.
Same period last year (crude plus cond.) 1,159,385,675 bbl.

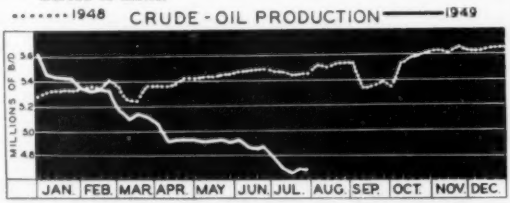
*Not including 78,880 bbl. condensate. †Including 17,533,540 bbl. condensate.

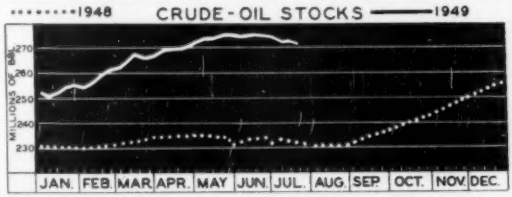
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

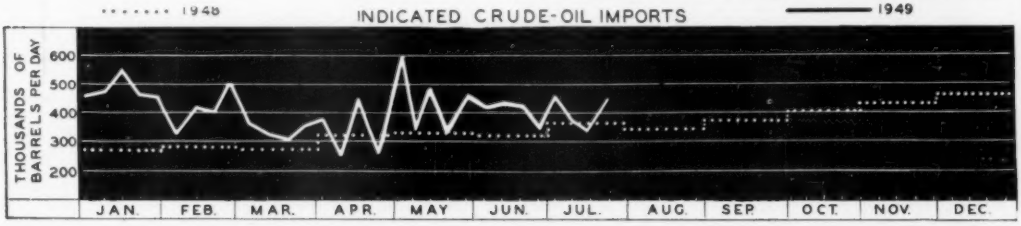
(Thousands of barrels)

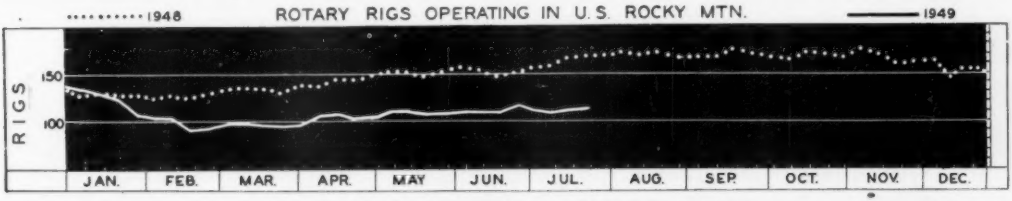
State of origin—	July 23, 1949	July 16, 1949	July 24 1948
Pennsylvania Grade	3,064	3,032	2,771
Other Appalachian	2,069	2,121	987
Ill., Ind., Mich.	15,366	14,913	11,464
Arkansas	2,960	3,008	2,579
Louisiana	15,407	15,460	10,545
North	3,671	3,611	3,075
Gulf	11,736	11,849	7,470
Mississippi	3,263	3,157	2,894
New Mexico	7,757	7,703	5,766
Oklahoma and Kansas	39,054	39,209	34,234
Texas	125,476	127,060	112,238
East Texas	16,832	16,844	15,837
West Texas	50,623	51,529	43,516
Texas Gulf	29,550	29,861	28,593
Other Texas	28,471	28,826	24,292
Rocky Mountain	14,162	14,126	9,387
California	35,760	35,204	30,213
Foreign	7,769	7,155	5,529
Total United States	272,107	272,148	228,607

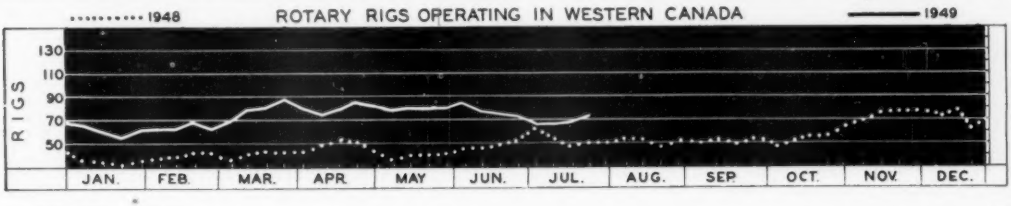
*Bureau of Mines.









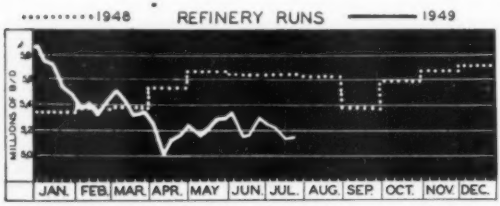


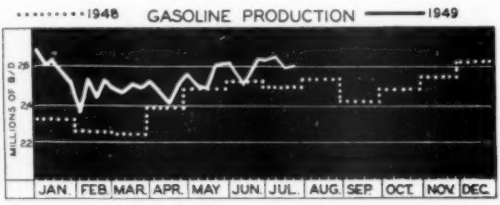
Refining Statistics

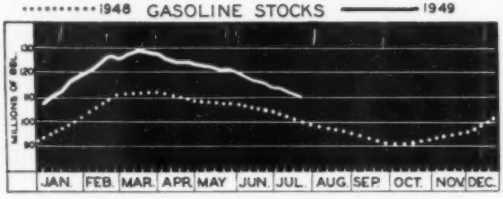
A.P.I. REFINERY REPORT, JULY 23
(Thousands of barrels)

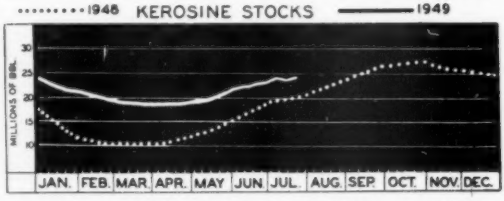
District	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, July 1948				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	756	332.4	31.4	141.9	155.4	26,187	10,484	22,242	10,897	891	320.7	43.5	170.6	222.6
Appalachian:														
District 1	78	36.4	0.9	9.6	10.1	2,521	420	672	518	93	40.0	4.8	12.1	11.1
District 2	64	32.9	1.4	6.0	10.1	1,072	162	230	306	36	15.5	1.1	4.6	10.0
Ind., Ill., Ky.	887	301.6	44.3	123.0	127.2	23,944	4,516	10,918	5,271	932	491.5	52.0	128.0	154.7
Okla., Kans., Mo.	421	228.7	11.3	87.0	53.6	10,141	1,445	5,561	2,391	483	246.2	22.8	87.0	79.0
Inland Texas	233	153.7	12.8	22.7	52.0	3,987	707	892	1,320	248	144.8	8.2	31.0	60.2
Texas Gulf Coast	1,210	627.9	61.6	206.7	210.6	15,429	2,945	10,896	7,876	1,395	601.5	102.8	295.2	259.9
La. Gulf Coast	394	213.7	28.3	79.4	60.1	5,171	2,245	4,666	2,000	435	185.5	45.1	92.7	77.9
N. La. and Ark.	75	30.6	4.7	10.4	17.1	2,728	469	870	304	84	30.5	7.5	12.2	19.5
Rocky Mountain:														
New Mexico	11	6.0		1.7	2.9	57	25	93	34	12	6.0	0.4	1.7	3.6
Other Rocky Mtn.	170	75.1	5.6	30.6	38.3	2,869	353	1,454	754	151	61.3	3.9	24.0	28.9
California	849	375.4	10.7	110.6	332.4	16,463	773	11,308	36,846	871	351.4	12.5	135.1	336.4
July 23, 1949	5,148	2,614.4	213.0	829.6	1,069.8	110,569	24,544	69,802	68,517	5,631	2,494.9	304.6	994.2	1,263.8
July 16, 1949	5,130	2,588.1	218.7	814.1	1,112.1	111,464	23,791	68,622	67,799					
July 24, 1948	5,647	2,554.1	309.4	941.0	1,293.7	100,641	20,267	50,562	47,899					

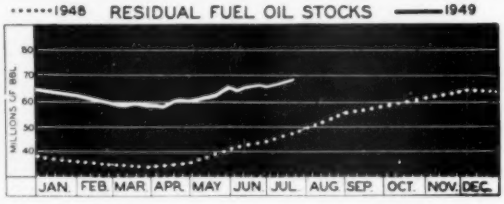
*At refineries including natural blended. †Finished and unfinished.

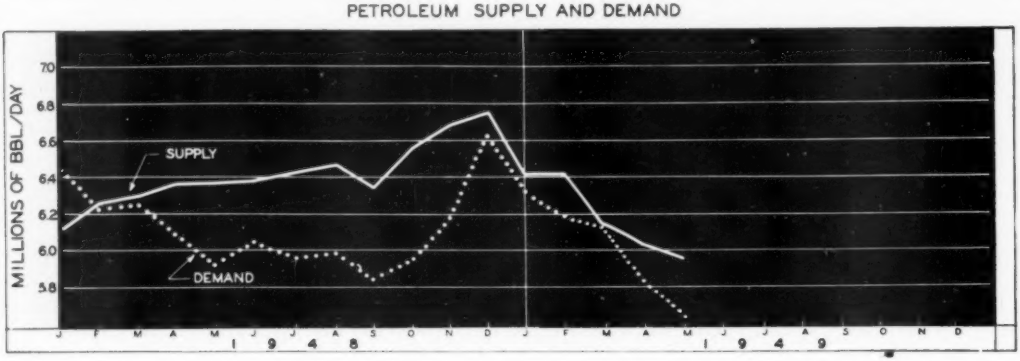












CRUDE PRICES
GRAVITY SCHEDULE

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.78			
19-19.9	1.85			
20-20.9	1.93	$2.25		$2.12
21-21.9	2.00	2.27		2.14
22-22.9	2.07	2.29		2.16
23-23.9	2.13	2.31		2.18
24-24.9	2.20	2.33	$2.56	2.20
25-25.9	2.26	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.40
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

INCREASED demand for gasoline in the first 6 months of this year has been a bright spot in refinery operation. Good gasoline sales have helped sustain operations during the months when heating-oil sales have been very much below normal either because of mild weather or lack of consumer and reseller buying for storage.

It has been a little more than a year since refiners were able to say that they could supply all gasoline needed by motorists. Since that time, much of the gain in gasoline consumption has come from the increase in the total of operating vehicles. In the first 6 months of this year domestic sales of motor vehicles gained 24.7 per cent over the same period in 1948. Factory sales for the domestic market during the 12-month period ending with June amounted to 5,700,000 units. Private and commercial vehicle registrations increased 8.7 per cent in 1948 but a large part of the gain came in the last half of the year. If the present trend in sales continues, this year's gain may be equally as great, indicating high gasoline demands in the coming months.

The increase in residual price on the Gulf Coast seems to have given the entire heating-oil market a firmer tone, a more general feeling that the market won't slide further down the scale.

The big problem confronting the transportation departments of suppliers is how to take care of postponed purchases, which have been building up over the past 4 months at the rate of more than 20 per cent of normal sales, if consumers and resellers try to crowd all of this extra demand into 1 or 2 months.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of August 1, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex Gulf Coast
Regular gasoline, 73-75 octane	9⅝-10	11-11.5	9½-10
Premium gasoline, 78-80 octane	10⅜-11	12-12.5	10½-11
42-44 w.w. kerosine	7¾-8¼	7.5-8.4	7.50-8
No. 2 straw fuel oil	6⅛-6¾	6.5-7.4	6⅜-6½
No. 6 residual	$0.85-0.90	$1.60	$1.35

NATURAL GASOLINE

	Group 3	North Texas	N. La
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6	6.3

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	11
750 vis., No. 3-4 neutral	14
2,000 No. 5-6 neutral	16-16.5

LUBRICATING OILS
Mid-Continent

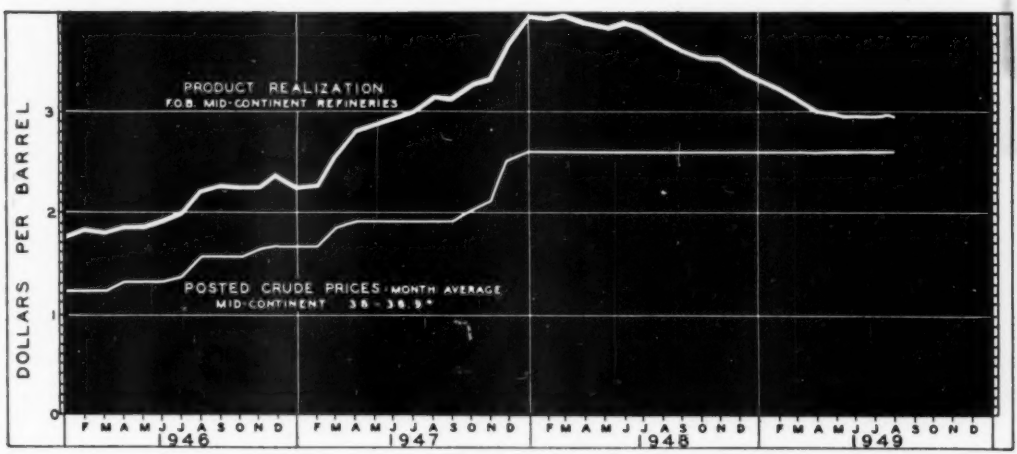
150-160 vis., D bright stock, 0-10 pp.	19
200 vis., No. 3 neutral, 0-10 pp.	12-14

Western Pennsylvania

144-155 vis., 10 p.t. bright stock	19.5
180 vis., 0 p.t. neutral	20.5

CRUDE-SCALE WAX
Mid-Continent

132-134 A.M.P.	4.5


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES-MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
0
1
2
3
F M A M J J A S O N D
1946
F M A M J J A S O N D
1947
F M A M J J A S O N D
1948
F M A M J J A S O N D
1949

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

Refinery Yields Not Geared to Full Needs

(Continued from page 22)

osine yields must be raised enough to average about 6.2 per cent for all the winter months.

If the expected winter demand for distillates is met without much change in the refinery-yield pattern, crude runs will have to be very high and stocks of gasoline and other products will climb to unmanageable levels. If gasoline demand continues good through the winter months, a yield of 39 or 40 per cent would add no more than about 20,000,000 bbl. to storage during the 6-month period, and suppliers would start the summer season with a smaller burden of excess gasoline in primary storage.

How much of a change in refinery operations would be required to produce about 40 per cent gasoline and 20 per cent distillate can be seen by comparing these figures with actual performance during the past 18 months, as shown in Table 1.

Price Is Chief Factor

A chart accompanying this article shows the percentage yields for each June for the past 10 years. The other chart shows the percentage of increase in demand for the same products since 1940. Comparison of the two charts suggests how far the present refinery-yield pattern fails to coincide with market requirements.

Price, of course, is the chief reason why refinery yields are so distorted. Gasoline has been profitable and heating oil has not been. Because of last winter's unexpected surpluses and the hope of a price cut in distillate, consumers and resellers have not been stocking up this summer as they did in former years. Today, however, the statistical picture for distillates is such that many oil men are ready to predict that the price will go up when the thermometer does down.

As for the price of gasoline—it faces a serious threat unless yields are reduced to prevent the prospect of piling up huge stocks during the fall and winter.

TABLE 1—REFINERY YIELDS BY MONTHS, 1948-49

1948—	Gasoline	Kerosine	Distillate	Residual
January	38.9	6.4	19.9	23.6
February	37.7	6.9	20.6	23.6
March	37.9	6.7	19.5	24.3
April	40.2	6.2	17.9	23.9
May	40.8	5.7	17.7	23.4
June	41.1	5.6	17.8	22.8
July	41.3	5.5	17.8	22.6
August	41.0	5.2	18.4	22.1
September	41.6	5.8	18.0	21.6
October	40.7	5.6	19.0	22.6
November	40.8	6.4	19.0	22.5
December	41.6	6.1	19.2	22.6
1949—				
January	41.1	6.0	18.7	23.7
February	41.6	5.8	18.5	23.5
March	42.5	5.4	17.5	23.7
April	44.1	5.2	16.3	22.2
May (est.)	44.7	4.6	16.2	22.3
June (est.)	45.0	4.5	15.0	21.8

Louisiana Mineral Board Will Meet on September 29

BATON ROUGE.—The State Mineral Board will meet here September 29 at 10 a.m. to open bids on state tracts. The board announced it has published additional tracts on which bids will be accepted until August 25.

Monday, August 15, is the deadline for accepting applications for advertisement and leasing at the meeting and Monday, September 19, is the last day docket material will be accepted for presentation to the board. Advertisement dates for tracts to be considered will be September 2, 9, and 16.

ECA Submits Report on Year's Expenditures

WASHINGTON.—The Economic Cooperation Administration reported last week on how it has expended the $5,909,300,000 available to it for the European Recovery Program from the date of its inception, April 3, 1948, to the close of the fiscal year June 30, last.

The report showed that $569,800,000 was expended for procurement of petroleum and products. Oil was the second most important commodity on the ECA list, being topped only by wheat, for which $740,300,000 was granted the Marshall plan countries.

The ECA currently is marking time and making plans for future operations while Congress wrangles over the fund to be granted for the current fiscal year.

The House of Representatives some weeks ago approved an appropriation of $3,568,470,000 which the administrator could spend in 10½ months if necessary. The Senate appropriations committee last week voted $3,778,380,000 for the full current year, a 10 per cent cut from the $4,198,200,000 which President Truman had asked and, on a yearly basis, some $300,000,000 less than the House provided for the shorter period.

The Senate committee also cut the fund which is to be made available for the last 3 months of the 1949 fiscal year. When Congress last year provided funds for ECA it added a provision to the bill that while they were intended to cover the full 15 months from April 3, 1948, to June 30, 1949, the President, if he found it necessary, could order them expended in 12 months, which he did.

The President then asked for an additional $1,074,000,000 to carry the program through the final quarter of the year, which the House allowed, but the Senate committee slashed $74,000,000 from the fund, making it a flat $1,000,000,000.

The ECA appropriation still has to be passed by the Senate, and then will go to conference to iron out differences between the two houses, so it is probable that the fund finally agreed upon will differ from both the House and Senate individual grants.

Refinery Aspects of ERP Explained by Levy

(Continued from page 26)

Western Hemisphere which, if developed, could increase the amount of oil available to Europe and available for export to non-European countries very considerably. At the same time, Europe is, and has traditionally been, an importer of American oil on a large scale from the United States as well as from American-controlled offshore sources. It is therefore from Europe's point of view not completely illogical or unreasonable to try at this moment to develop its own oil resources in order to cover an increasing part of domestic needs and also to expand export markets. This in turn may hit American oil in two ways. It might mean fewer sales by the American oil industry to Europe and might increase competition outside Europe between American and European oil. It might also result in increased imports of oil into the United States."

All these factors, Levy pointed out, lead to the probability that major readjustments will confront the American oil industry.

"The problem is not an easy one which can be described in simple and elementary terms," Levy said. "It is a problem where many interests must be considered and where it is necessary to act with moderation and foresight. One must, in particular, be aware of the fact that the American oil industry, insofar as it is dependent on foreign markets, cannot by mere force of argumentation or by complaints of discrimination succeed in selling oil to markets that cannot afford to pay for it. One cannot get water from stone or dollars from nonexisting dollar accounts but, given time, one can, I believe, work out ways and means to minimize the dollar costs of American oil.

"Above all, the American oil exporter is, I am sure, aware that ECA assistance to Europe is giving him the time required and a chance really to evaluate the world-wide dollar problem which threatens his very existence, and to plan and undertake the necessary adjustments in his future operations.

"If Europe achieves recovery with ECA assistance and if the United States oil industry adjusts itself to the realities of the situation, I believe the lot of American oil in world markets, while most difficult, will not be disastrous, as is sometimes feared."

EQUIPMENT MEN . . . in the News

Speirs to Sell Globe Tools in Illinois

Clark Speirs, well-known sales representative, has recently established a store in Fairfield, Ill. For several years he sold and serviced Globe equipment in the Bakersfield and Los Angeles area for Globe Oil Tools Co. His many friends will be interested to know that he is established in Fairfield, and that he maintains a complete stock of Globe junk catchers, all size Globe 2-Cutter rock bits for both regular and geophysical drilling, and Globe cross-section rock bits.

Oilwell Announces Several Changes in Personnel

Four personnel changes in the Gulf Coast division of Oil Well Supply Co. have been announced by F. D. Smith, division manager.

John D. Boggs, Jr., manager of the Eunice, La., branch store, has been transferred to Jennings, La., as store manager and is succeeded by Donald E. Bagby, field representative at Eunice. J. R. Walsh, storeman in the Jennings store has been named the new field representative at Eunice.

In Texas, John W. Mays has been named manager of the Beaumont store. Before coming to Oilwell, Mays was in South America with Shell Caribbean Petroleum Co.

C. D. Gammello, manager of the Wooster, Ohio, branch store, has been named district material supervisor for the Ohio-West Virginia district. C. H. Maynard, eastern division manager has announced. Gammello, whose headquarters will be at Charleston, W. Va., is succeeded by B. E. Grey, who has been district representative at Zanesville, Ohio.

New Refinery Service Company Formed

Refinery Manufacturing Co., a Tulsa firm, has recently been incorporated to offer engineering, development, and manufacturing facilities for scientific, laboratory, and gas-measurement equipment to the oil industry.

Formerly the R. S. Manufacturing division of Refinery Supply Co., Tulsa, the organization manufactured RS and AC-ME specialty items exclusively for Refinery Supply Co.

W. A. Schlueter, head of Refinery Supply Co. is also president of the newly formed Refinery Manufacturing Co.

Fowler Made Vice President For Sparling-Davis Co.

Gant W. Fowler has joined Sparling-Davis Co., Ltd., Edmonton, Alta., Canada, as vice president and director. He brings many years of pipe-line experience to the young Canadian company, having served as vice president and director of Parkhill Truck Co., from which position he resigned to accept his present duties.

Sparling-Davis, under licenses from Parkersburg Rig & Reel Co., is manufacturing treaters and separators as well as storage tanks, process piping, and other oil-country equipment. The company also contracts oil-field, pipeline, and refinery construction and engineering.

Fowler is also vice president and director of an associated company, D. & S. Construction Co., Inc., Wellington, Calif., tank and pipe-line contractors.

Moore Visits Latin America for Oil Base

During the past month Art Moore, vice president, Oil Base, Inc., has been making an extended tour of inspection in South America for his company, visiting Caracas, and fields in Eastern Venezuela. Returning through Mexico City, he spent a few days contacting with representatives in that city.

Oil Base also reports that A. K. Brown and Jack Long, mud engineers, have returned to the head office at Compton, Calif., for an extensive training course in White Magic, the oil-emulsion mud for top-hole drilling. Brown and Long will help supervise and record results of experiments now being made on the product.

Brown represents Oil Base in the Rocky Mountain territory and Long is the Texas representative, headquartered at Houston.

Marsteller, Melius Made Rockwell Vice Presidents

W. A. MARSTELLER

Election of William A. Marsteller, Chicago, and Robert P. Melius, Milwaukee, as vice presidents of Rockwell Manufacturing Co., Pittsburgh, has been announced by W. F. Rockwell, Jr., president. Marsteller for the past several years has been manager of advertising and market research for the company, as well as vice president of Edward Valves, Inc., East Chicago, Ind. He is completing a 2-year term as president of National Industrial Advertisers Association, the nation's largest advertising organization.

Melius was recently placed in charge of sales for the newly created Power Tool division of Rockwell Manufacturing Co., which will market Delta, Crescent, and Multiplex tools.

Swan to Direct Rolo's Canadian Branch

R. K. FRANKLIN

R. K. (Bob) Franklin, founder and owner of Rolo Manufacturing Co., of Houston, is spending 2 weeks in Calgary and Edmonton, Alta., Canada, setting up the headquarters and branch offices of Rolo, Ltd., of Canada.

Headquarters will be in Calgary with a branch in Edmonton. William H. Swan, formerly chief engineer and general manager of Rolo Manufacturing Co., will be Canadian sales manager. Swan will also handle the company's business in the Rocky Mountain region of the United States.

F. E. Schuchman Made President of Homestead

F. E. Schuchman has been elected president of Homestead Valve Manufacturing Co., valve and steam cleaner manufacturer. Beginning as a core

maker in the foundry of the company which his father founded in 1892, he has worked in every department of the organization and also holds title of general manager and treasurer at the present time.

W. R. Schuchman, another son of the founder, was named chairman of the board after 28 years as president, and J. E. Roth, former board chairman, was named chairman of the advisory committee. Other officers named were Bradley McCormick, secretary; and N. E. Kolesar, assistant treasurer.

British Oil-Equipment Manufacturers Meet

The Council of British Manufacturers of Petroleum Equipment, with a membership of 327, has just completed its seventh annual general meeting.

E. F. E. Howard, chairman of the council, reported on the past year's activities, including standardization of petroleum equipment and materials; promotion of flying visits by members to refineries, oil fields, and research centers in Europe, and a series of technical meetings.

T. L. Bonstow, technical adviser to the council, gave a report on committee activities. His report paid tribute to oil-company personnel and manufacturers who have worked on the committees to improve British manufacturing methods.

Col. A. S. Osborne, recently appointed as director of the council, discussed his future plans for the organization and reported on his travels since having received his appointment.

All reports confirmed the fact that the council has made fine progress during the last year and it was generally agreed that the same general policies that had paid dividends in the past, would be pursued in the future.

Los Angeles Nomads Certify New Members

Earle M. Boggess, Los Angeles Nomads, presents certificates of membership to Bill Correy, Lacy Oil Tool Co.; Leo Theisen, Falcon Products; Ken Wright, B & W, Inc.; Lindsey Coltrand, Crescent Tool Co.; and Robert Kirk, Byron Jackson Co. Presentation was made at the chapter's June meeting

C. F. Johnson Advanced To Manage Valve Sales

C. F. JOHNSON

C. F. (Cy) Johnson, who has been associated with Manning, Maxwell & Moore, Inc., Bridgeport, Conn., for the past year, has been appointed manager of valve sales of the company, Chester H. Butterfield, vice president in charge of sales recently announced.

A graduate of Rice Institute, Johnson's business career has included the positions of product research, district engineer, and division engineer for Reed Roller Bit Co., of Houston, sales and management responsibilities with Security Engineering Co., Whittier, Calif., and chief engineer of distributor products division of Watson-Stillman Co. of Roselle, N. J.

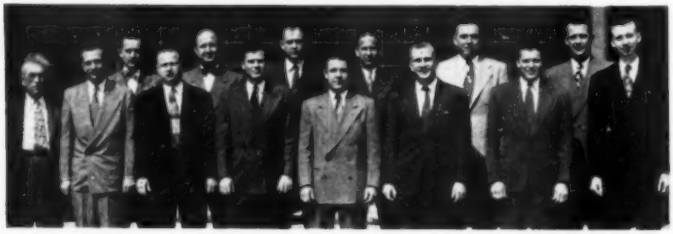
In his new position, Johnson will be in charge of all valve sales activities including Hancock valves and Consolidated safety and relief valves. His headquarters will be in Bridgeport, Conn.

Southwest Industrial Firm Represents W. S. Rockwell

Southwest Industrial Heating Engineers, Navasota, Tex., and Houston, have recently been appointed representatives in Texas for W. S. Rockwell Co., Fairfield, Conn., manufacturers of butterfly and slide valves for the petroleum industry, it was announced by Charles F. Bishop.

Bishop was directly connected with W. S. Rockwell for many years in the engineering department and later as plant superintendent. He resigned from Rockwell to take over the Texas territory for Rockwell, Bryant Industrial Division, and Seaboard Refractories Co., all of which concerns are now represented by Southwest Industrial Heating Engineers.

Eggelhof Engineers Hold Sales Meeting in Houston



The entire sales staff from the eight offices of Eggelhof Engineers is shown during a 3-day sales meeting at Houston. Chief engineers of Cuno Engineering Corp., C. H. Wheeler Manufacturing Co., and Todd Combustion Equipment Division, were also present to review the technical details and application of their equipment. Eggelhof representatives are: (front row) Henry Eggelhof, Jim Stafford, and Jack Rush, Dallas; Bob Molnari, Leonard Meyer, Bob Behnken, Will Molnari, and Frank Lenoir, Houston; (back row) James Powell, San Antonio; Gravice Hill, Lubbock, Tex.; Gordon Catts, Corpus Christi; Henry Turner, New Orleans; Morley Hudson, Shreveport; and Hugh Brightwell, Tulsa

Black Named Distributor For Sun in California

L. C. Black, Long Beach, Calif., has been appointed California distributor for Sun Engineering Co., of Oklahoma City, according to Paul Myers, sales manager.

Sun Engineering products include a line of lube-oil filters and diesel-fuel filters. These items will now be available to supply stores and companies throughout the West Coast area through Black, who will stock the complete line.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

3—Type C-50 H. P. Superior Oil Eng. with 20" P.D., 7 Groove Pulleys & Idlers 50 H.P. Fairbanks-Morse Type Y vertical oil Eng. flat 12" x 5' pulley. 165 H.P. Miller Twin gas eng. completely overhauled. All above in good operating condition. Brundred Oil Corporation, 208 Alameda Road, Kansas City 2, Mo.

FOR SALE: Practically new 70 B Brewster Drawworks equipped with G. M. Diesel 6 Motor & transmission, all friction clutches—automatic cathead. This drawworks has drilled 35,000 feet in shallow wells—being replaced by larger unit. Price $10,000.00 f.o.b. Salem, Illinois. Herman Graham Drilling Co., Box 176, Salem, Illinois. Phone 580.

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO
3415 Westminster, Dallas 5, Texas

NEW

A.P.I. CASING COUPLINGS

1,441—5½" O.D., 8 R. T. Long N-80
794—5½" O.D., 8 R.T. Short J-55
79—$6^5/_8$" O.D., 8 R.T. Long J-55
100—7" O.D., 8 R. T. Long J-55
144—7" O.D., 10-V Long J-55
15—$8^5/_8$" O.D., 8 R.T. Long J-55

ROCK ISLAND OIL & REFINING CO., INC.
335 West Lewis Street
Wichita, Kansas **Telephone 7-3325**

EQUIPMENT FOR SALE

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000'—Respooled for Your Inspection—Cable Tools for Sale. General Tool & Supply Co., P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: Failing "1500" portable rig for shot-hole, core, water-well, and shallow production drilling. Equipped with sand reel and bailer. Mounted on GMC truck. Rig and Truck in excellent condition. Rider & Montgomery, Box 523, Douglas, Wyoming.

FOR SALE, at Birch Run, Michigan, #50 Oilwell geared power complete. 30 H.P. 2 cycle Type C Superior gas engine. #50 Oilwell belt tightener complete with shaft, bearings, and clutch. Circulating tank, 16' x 19' house. All in good condition. $2000 as it stands. Was used to pump twenty-five 1540' wells in field now abandoned. Smith Petroleum Company, 401 Keeler Building, Grand Rapids, Michigan.

8500' new $2^3/_8$" OD 4.70# J55 SS 8Rhd. Tubing per ft 48c. 20,000' used 3½" OD 7.70# 8V & P.E. line pipe, good condition, 30c per ft. 500' used 16" P.E. 42#, good condition, per ft. $2.00.

OKLAHOMA PIPE & SUPPLY
Tel. 62-1644—1237 S.E. 29th
Oklahoma City, Okla. P.O. Box 4671

Several Army Surplus 4½" x 6" Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

FOR SALE

Used Oil Field Gas Engines

- 3—Model 145 GKU Waukesha special oil field units with gas engine starters, gas, gasoline, and butane burning equipment, and otherwise standardly equipped, less power take-off, mounted on oil field type steel skids. Location Okla. City, Okla. Price, each $2,820.00
- 2—Model 6-PCS-1879 Buda standard oil field power units, with gas engine starters, gas, gasoline and butane burning equipment and otherwise standardly equipped, less power take-off, mounted on oil field type steel skids. Location Duncan, Okla. Price, each $6,624.00
- These engines are practically new and guaranteed accordingly.
- 1—R-225 Climax 8 cylinder engine complete with gas, gasoline and butan carburetors, and engine starter, mounted on oil field type steel skid. Location Duncan, Okla. Price "as is" $1,100.00

Address inquiries to Box D-108, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

5—35,000 bbl. steel tanks, riveted, 5' x 10' steel sheets, 6 rings high, complete shell, bottom, angles and ladder, cut down, rivets backed out, approximate weight 95 tons each. Price $3,500.00 each, gradesite, Stoy, Illinois.

W. C. BERRY
Box 1858 **Tulsa, Oklahoma** **Phone: 3-6141**

EQUIPMENT FOR SALE

SULLIVAN 22 Core Drill. Also truck mounted cable tool rig. Both only slightly used. Excellent condition throughout. R. B. McElwaine, Box 127, Little Rock, Ark.

ROTARY table, 4 shev. block, drill works, FWD motor, water pump, gas mud pump 4X7½X10 and motor, hose, mast 300' of 4" drill pipe, tool house, jin pole. Willard M. Glasco, 320 4th Nat'l. Bldg., Wichita, Kansas.

FOR SALE

The following oil well equipment located at Bowie, Texas

New 10" casing $2.25 per ft.
Used 8" casing $1.25 per ft.
Used 7" casing 90c to $1.30 per ft.
Used 5½" casing 80c to $1.00 per ft.
Used 2" upset tubing 30c per ft.
New and used 2" and 3" line pipe
1—Parkersburg 40 H. P. pumping unit $2,000.00
2—Emsco 10 H.P. pumping units complete with Continental C-66 engines $1,700.00.
2—6' x 20' used heater treaters $1,000 each
2—250 Bbl. used bolted tanks $150.00 each
New and used ⅝" and ¾" sucker rods—10c to 30c per ft.
Miscellaneous fittings and well head connections.

NU-ENAMEL OIL CORPORATION
604 First National Bank Annex
Dallas, Texas
Telephones
Dallas Riverside 8160, Bowie 727

PIPE AND CASING BARGAINS

All pipe used lap weld. Tubing not cleaned of paraffin.
All A1 tubing and casing, good collars and threads.

TUBING: 10,000 ft. $2^3/_8$ upset tubing, 4.50 wt. 11½VT. 19c ft.
14,000 ft. $2^3/_8$ regular tubing, 4.50 wt. 11½VT. 20c ft.

USED LAP WELD CASING, A1, Ready to Run
3200 ft. 5½ O.D. 13 lb. 11½ V.T., 60c ft.
3100 ft. 7 in. O.D. 17 lb., 10 V.T., 60c ft.
1000 ft. $8^5/_8$ O.D. 24 lb. 8 V.T. $1.20 ft.
1000 ft. 10 in. 32.75 wt. 8 V.T. $1.75 ft.
3200 ft. 7 in. O.D. 20 lb. 10 V.T. 80c ft.
(F.O.B. Cars Northern West Va.)

FINEST USED LAP WELD IN WEST VA.
21,000 ft. 5½ in. O.D. A1. 13 lb. casing, 62c ft.
18,000 ft. 7 in. O.D. A1. 20 lb. casing, 85c ft.
2,860 ft. 7 in. O.D. No. 2 grade, 20 lb., 72c ft.
(F.O.B. Cars near Charleston, W. Va.)

BARGAINS IN LINE PIPE
75,000 ft. $2^3/_8$ 3.75 wt. used line pipe, threaded and shopped, ready to run, F.O.B. cars, Friendship, N. Y., 15c ft.
60,000 ft. $2^3/_8$, 3.75 wt. some used 4 lb. tubing not shopped, 1/3 A1 pipe, 1/3 second grade, 1/3 3rd grade pipe, 7½c ft. Ship from Oil City, Pa.
DRIVE PIPE: 2,500 ft.—$8^5/_8$, 29 and 32 lb., reconditioned drive pipe, heavy collars, good tapered threads, ready to run, $1.38 ft. (from Oil City, Pa.).
Line Pipe: 7,000 ft., A1, used once, 1 in. heavy seamless tubing, long collars, 14c ft.
14,000 ft. $2^3/_8$, 3.75 wt., used, reconditioned line pipe, ready to run, 14c ft.
CASING: 3,000 ft. 6¼, 13 lb. lap weld, 11½ V.T. used casing, ready to run, 65c ft. 2,000 ft. $4^7/_8$ casing, 65c ft.

SEND US YOUR PIPE ORDERS AND INQUIRIES
12,000 ft. 5 in. O.D. used wrought iron line pipe, T&C 8 thread, 45c ft. Will plain end and bevel at cost of extra work.
4,500 ft. 4 in. O.D. T and C. good straight pipe, ½ of it shopped, 42c ft. (Ship from Oil City, Pa.).

RIGS—ENGINES—BELTS—TANKS
CABLE TOOLS
Spudders, Drilling Engines, Regulators, Sucker Rods, Bits, Bailers, Wire Lines.
Phone or call on H. P. McGinnis.

TRI STATE OIL AND GAS CO.
Box 827, Phone 7-5121 or 7-5688
for Appointment.
Parkersburg, West Va.

120,000′—6⅝″ OD, 17.65#, seamless, range 3, beveled.
80,000′—4½″ OD, 8.65#, seamless, range 3, beveled.
2—complete pumping stations. All pipe & equipment practically new. Sell any quantity. Located Tulsa.

W. C. BERRY

P.O. Box 1858 — Tulsa, Oklahoma — Phone: 3-6141

HEAVY DUTY geophysical drill, 18′ kelly, chain pull down, hydraulic lift mast, 4½ x-6 G. D. pump, Twin Disc clutches. Mounted on 1943 Ford Truck. Waters Drilling Service, 69 Beacon Place, Pasadena 8, Calif.

FOUR Lufkin single crank #31 C pumping units, complete with 30 H.P. General Electric motors. Full particulars, Wiegand Bros., Milam Bldg., San Antonio, Texas.

NATIONAL "50" Compound Double Drum Rig 126′ Cantilever Ideco Mast, 10′ substructure, 6,000′ 4½″ drill pipe, this rig complete and in excellent condition. P.O. Box 205 Sta. B, Bakersfield, California.

FOR SALE OR TRADE: Jumbo C. Fort Worth Spudder, trailer mounted, shear poles, E. 60 Allis-Chalmers power. With or without complete tool line, dog house, etc. Would trade for good string range #1 internal flush 2⅞ drill pipe, core barrel, etc. Box 378, Cherryvale, Kansas.

SRK WAUKESHA ENGINE

Completely overhauled, first class condition, mounted steel skids. New price, $2,390. Our price $995.

EAST TEXAS SALT WATER DISPOSAL COMPANY
P.O. Box 633 — Phone LD 5
Kilgore, Texas

FOR SALE

3½ miles, new 4½″ O.D. 11#, 1200# test API Continuous Weld Line Pipe, T & C, 78c per foot, f.o.b. cars Midcontinent area. Address inquiries to

Box D-120, The Oil and Gas Journal, Tulsa, Oklahoma

FOR SALE AT MARKET PRICE
New Pipe and Rods
Offered Subject to Prior Sale

50,000′—1″ Black Pipe
50,000′—2″ 4# Tubing
20,000′—2″ Line Pipe
10,000′—7″ O.D. Casing
20,000′—⅝″ Sucker Rods
25,000′—⅝″ Pull Rods

Write or Telephone

PENNSYLVANIA OIL AND GAS MANAGEMENT ASSOCIATES

Oil City, Penna. — 41-263

COMBINED VAPOR SEPARATOR & FRACTIONATOR FOR THERMAL REFORMING

One (1) New 5′-6″ ID x 61′-0″ over-all height Bubble Tower made of 1¼″ Plate and lined throughout with 5/64″ and 7/64″ thick, 11-13% Chrome stainless steel, type 405. Stainless steel support plates in place for 15 Trays, (Trays not included). Constructed in accordance with the API-ASME Code, stress relieved and radiographed. Designed for 400 PSI @ 750° F. Fabricated by A. O. Smith Corporation. Platform and ladder clips installed.

WOOD RIVER OIL & REFINING CO., INC.
335 West Lewis Street, Wichita, Kansas
Telephone 7-3325

FOR SALE: One National Shot Hole Drill, solid kelly, Gardner-Denver pump, now working in West Texas. Also 500 gal. Dodge water truck. Box C-968, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1 UMT Allis-Chalmers tractor on new rubber with Cooper Winch. Price $1,000.00. 1 Skid type Cooper Unit—Price $2,000.00. 1 Skid type Cardwell H Spudder with MZR Waukesha Motor. New string of five inch tools with quick change-over sockets. New 4,000 foot line. Price $5,000.00. Also have Cardwell Model QS Unit with telescope pole. Mounted on truck. Might sell. These Units are in good condition and suitable for wells up to 3,500 ft. Fred Frogge, Leon, Kansas. Phone No's 4316 or 2952.

FOR SALE: Tremendous quantities all sizes, pressures and types pipe fittings and valves. Also neoprene gasket rolagrip couplings. National Bulk Carriers, Inc., 630 Fifth Avenue, New York 20, N. Y.

FOR SALE: Oil well casing and line pipe. Direct price and mill shipment. Plagenz, Park Building, Cleveland, Ohio.

FOR SALE: 2, complete Wilson Mogul skidtype spudders, with double pole mast costing $3200, powered by 165 hp. GAKU Waukesha motors, good condition, F.O.B. Cars, price $4,000 each, Model 121, Serial No. 3760. One Wilson Mogul Spudder, with mast, less engine, $2,250. 1—145 H.P. Young Drilling engine, complete, A1 condition guaranteed, gas-gasoline, $2,250.00. 1—Riise 110 H.P. Drilling engine, natural gas, $2,000. 1—Clark 2 cy. 70 H.P. with 6 cy. starting engine, $350. One Caterpillar 60—gasoline-gas engine, with jack shaft and clutch, flat belt drive, $650.00. 25 Pumping engines, South Penn 20 H.P. $125; 20 H.P. Reids and 22½ H.P. Bessemers $150 to $200 each. 100 Pumping and drilling belts for sale. McGinnis, Tri State Oil and Gas Co., Box 827, Parkersburg, W. Va.

NEW 6⅝″ O.D. API LINE PIPE

Seventy-three (73) Miles New 6⅝″ O.D. 13# API Electric Weld Line Pipe, Plain End, Beveled for Welding, Regular Mill Coating, double random length Van Dyke Protectors Applied. Rock Island Oil & Refining Co., Inc., 335 West Lewis Street, Wichita, Kans. Telephone 7-3325.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17″ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

NEW
FRACTIONATING TOWER
REFLUX DRUM

One (1) New fractionating tower, 5′-0″ I.D. X 89′-6″ over-all height X 1⅛″ plate. Thirty-four (34) bubble trays, ten (10) 18″-300# manways. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

One (1) new horizontal reflux drum, 5′-6″ I.D. x 18′-6″ over-all length x 1⅛″ plate. Stress relieved and built in accordance with API-ASME Code for 350 PSI working pressure.

ROCK ISLAND OIL & REFINING CO., INC.
335 West Lewis St. — Wichita, Kansas
Phone 7-3325

FOR SALE: 10,000 ft. 20″ OD x ¼″ Wall New Electric Weld Steel Pipe, Double Random Lengths; 50,000 ft. 18″ OD x ¼″ Wall Used Steel Pipe, Single Random Lengths. Utility & Industrial Supply Company, 921 Michigan Ave., E., Jackson, Michigan.

FOR SALE: Two like new 74,000 bbl. cap. tanks. Low price, at Morgantown, W. Va. 2 new 10,000 bbl. bolted at N.Y. Darien Corp., 60 E. 42nd St., N. Y., N. Y.

FOR SALE: Sullivan 300A drilling rig complete ready to move to job, terms to reliable party. Phone 6508 or 3996, P.O. Box 501, Abilene, Texas.

TANK HEATERS
Thermetal Co., Sales Engineers
4529 Gillham, K. C. (4), Mo.

GEOPHYSICAL RIGS for sale, or will furnish rigs and help finance experienced driller starting in contracting business. Write Box D-123, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: A-1 quality pipe; 30,000′ 5½″ O.D. 14#; 100,000′ 2″ line pipe; 25,000′ 2⅜″ 4½# upset tubing. Prices very reasonable. Write, wire, or phone The Interstate Pipe & Supply Company, Marietta, Ohio. Phone 2468.

6000-FT. ROTARY RIG, diesel powered, complete with 4½″ drill pipe, ready to drill. Near Alice, Texas. Full particulars and price, Wiegand Bros., Milam Bldg., San Antonio, Texas.

ONE—36L Bucyrus-Erie Spudder. New type and design, complete with steel dog house, Kohler Light Plant 1½KW, has 7″ and 5″ tools (Note—This machine is in excellent condition). Priced $21,000.00. One New D7 Caterpillar Tractor, equipped with 8′ LaPlante Choate inside bull-dozer, 3 speed, Hyster-winch. This tractor has less than 200 hours. Excellent shape. A. M. Perrine, P.O. Box 87, Salem, Illinois. Phone 1064 or 901W4.

FOR SALE in our Pampa gasoline plant: Two 163 horsepower 207# working pressure Wm. Bros water tube boilers complete with boiler house, pumps, and all auxiliary equipment. Now available. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

EQUIPMENT WANTED

WANTED: One 11x20 or 12x20 Ingersoll-Rand compressor cylinder assembly complete, preferably type XG gas engine driven. Earl E. Knox Company, Erie, Penna.

HELP WANTED

CONSTRUCTION MAN

For 2-year project, with civil engineering and pipe line building experience, top references. Address Box C-981, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Mechanical Engineer. Experienced in design of pumping units and well head equipment. Excellent opportunity for right man to become Chief Engineer for well established company. State age, qualifications, experience. Address: Box C-967, The Oil and Gas Journal, Tulsa, Oklahoma.

HOUSTON DISTRICT Sales Engineer: Engineer familiar with pumps, compressors, exchangers, etc., having sold this type of equipment in Texas for at least the last 3 years to refinery, gasoline plant, and pipe-line companies. Replies confidential. Box D-117, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL HEAD EQUIPMENT SALES AND SERVICE REPRESENTATIVE

For Oklahoma territory. Man needed for service and sales work on well heads and valves. Must be experienced in production, live in Oklahoma, and not afraid of work. Reasonable salary. Communicate by letter with full particulars to

LAWRENCE G. WOOD
McEvoy Company, P.O. Box 1841,
Oklahoma City 1, Oklahoma

HELP WANTED

WANTED: Seismologists for division office of major oil company. Men with considerable experience as party chiefs preferred. These positions very attractive for men with families who want to settle in permanent locations. Give full details of education and experience in first letter. All replies will be held confidential. Reply Box D-113, The Oil and Gas Journal, Tulsa, Oklahoma.

ASSISTANT TOOL PUSHER wanted. Must be Petroleum Engineer under thirty, who has actually roughnecked or drilled in West Texas or New Mexico. Send resume of experience to W. W. Carter, 539 Amarillo Building, Amarillo, Texas.

M.C.B. CLERK. Oklahoma. Must have working knowledge of A.A.R. rules; be able to do complete billing, checking and inventory work. State age, qualifications and experience. Reply Box D-124, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW foreign and domestic Oil Employment Directory. Over 500 listings in drilling, production, refining, natural gasoline, pipelines, geological, exploration, supplies, manufacturers, services; and trucking, refinery and pipeline contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2803, Tulsa, Okla. (Our 29th Year).

SITUATIONS WANTED

LANDMAN; many years major company experience; geological background; desire connection; company or independent operator. Box D-109, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFICE and warehouse clerk with executive ability, three years in Venezuela, good references, wide oil experience, will accept foreign employment, available in three weeks: Post Office Box 264, Hamilton, Ontario.

MINING Engineer, production and management experience, presently employed as Petroleum Engineer, desires position Latin America. Excellent knowledge of Spanish. Age 33. References. Box D-119, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER-SUPERINTENDENT — M.S. in Ch.E., age 35, registered Texas engineer, thorough knowledge refining, nine years varied experience engineering and plant supervision, most recently manager small refinery, available at once due to plant shut down. Write WRS, Box 112, Winnsboro, Texas.

EXECUTIVE with thorough knowledge of refinery operations and materials desires to represent manufacturer of nationally advertised products. Box D-115, The Oil and Gas Journal, Tulsa, Oklahoma.

INDEPENDENT Petroleum Geologist with up-to-date Oklahoma Regional subsurface maps, records, and years of experience with major oil companies, desires combination office and field geological work from Tulsa headquarters. P. O. Box 1884, Tulsa, Oklahoma.

REFINERY OPERATING EXECUTIVE SEEKS CHALLENGING JOB

The writer has a responsible refinery job now but wants a better one which will demand full exercise of everything he learned in school and in 13 years experience in refineries in many parts of the country, directing the production of gasoline and its components under war time and peace time conditions.

I am a chemical engineer, 36, thoroughly acquainted with refinery operations and techniques, especially familiar with all processes for making and treating motor fuel—including both Fluid and Thermofor Catalytic Cracking. Men like me and work for me—and I like them.

Married and have two children. We'll go anywhere opportunity calls. Box D-121, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER, Houston resident, well acquainted and presently contacting Chemical, Refining, Allied Industries. Available short notice. Box D-111, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: B. S. Six years excellent drilling and production experience; wants supervisory position with aggressive Gulf Coast Independent. Box D-116, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

MANAGEMENT of small substantial oil company operating in Texas wanted by operator of wide experience and with ample reference as to ability and responsibility. Prefer proposition with participation in results produced. Box D-107, The Oil and Gas Journal, Tulsa, Okla.

ENGINEER with fifteen consecutive years experience directing engineering, construction, and operation of refining and gas processing plants and facilities, and engaged in consulting work for past several years, desires permanent connection requiring top flight engineering and management ability. Box D-125, The Oil and Gas Journal, Tulsa, Okla.

LEASE AND DRILLING BLOCKS

FOR SALE: Oil and Gas Leases and drilling propositions in shallow territory of Allen, Simpson, and Warren Counties, Kentucky. W. P. Harley, Bowling Green, Ky

HAVE three small leases in sight of new oil strike at Seventy-Six, Clinton County, Kentucky, of 200 bbl. daily. Will take royalty overide only, if taken quick. John A. Damron, Albany, Kentucky.

WILL BUY oil leases anywhere, large or small blocks if any likelihood of oil field or good geology, provided you co-operate in furnishing all necessary information. Write fully what you have. Box 2153, Denver, Colo.

WANTED: Leases and drilling propositions, proven or semi-proven. Only large acreage wanted. West of Mississippi River only. Fast drilling action if all conditions are right. Box D-126, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFERING over two-hundred-thousand acres of southland saw timber and land with oil rights. Box D-122, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW MEXICO OIL FIELDS

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DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

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PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEGAL BLANKS

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WANTED

WANTED: OPERATOR to drill and finance well to depth of 4500 ft. in Williamson County, Texas. 8000 acres in one block. Tested with Magno-Electrograph. Correspond with Ed Ilse, Route 2, Georgetown, Tex.

FOR SALE

88,000 ACRES Southern Tennessee Timber —Mineral land. No reservations $3.50 acre. Details, Earl Jester, 12744 Vanowen, North Hollywood, California.

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Rocky Mountain

(Continued from page 105)

gas well, est. volume 400,000 cu. ft. per day, Pictured Cliffs 3,416.

WILDCAT FAILURE IN NORTHERN NEW MEXICO

Horse Lake, Rio Arriba County: Southwestern Explo. Co. 1 Sargent, NE SW NE 15-29n-2e, 1,194 TD, plugged and abandoned.

SOUTH DAKOTA WILDCAT FAILURES

Butte County: Teepee 1 Schlottman, SW NW NE 33-9n-7e, dry, TD 1,414 ft.

Fall River County: Pacific Western 1 Christiana Gov't., NW NW NW 10-11s-1e, dry, TD 4,080 ft.

Fall River County: Pacific Western 1 Goot, NW NW SW 10-11s-1e, dry, TD 4,080 ft., Dakota 1,228 ft., Fuson 1,480 ft., Lakota 1,520 ft., Morrison 1,567 ft., Sundance 1,710 ft., Spearfish 2,020 ft., Minnekahta 2,689 ft., Minnelusa 2,877 ft., Pahasapa 3,968 ft.

LEGAL

ADDITIONAL TRIBAL INDIAN LANDS BEING ADVERTISED: Notice has been posted that 14,572.97 acres of additional Tribal Indian lands have been offered for sale, bids on which will be opened August 9, 1949, at 2:00 P.M., at the Uintah & Ouray Agency office, Fort Duchesne, Utah. The acreage being offered is located in Township 4 South, Ranges 4, 5, 6 and 7 West, USBM, State of Utah. Full particulars, with exact description of acreage may be obtained from the Uintah and Ouray Agency, Fort Duchesne, Utah, or the U. S. Geological Survey, Casper, Wyoming.

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CALENDAR OF EVENTS

August

United Nations Scientific Conference on the Conservation and Utilization of Resources, U. N. Interim Headquarters, Lake Success, N. Y., August 17-September 6.

September

Interstate Oil Compact Commission, summer quarterly meeting, Stanley Hotel, Estes Park, Colo., September 1-3.

American Institute of Chemical Engineers, Mt. Royal Hotel, Montreal, September 6-9.

Pacific Coast Gas Association, fifty-sixth annual convention, Santa Barbara, Calif., September 7-9.

Instrument Society of America, annual meeting and exhibit, Municipal Auditorium, St. Louis, September 12-16.

National Petroleum Association, Hotel Traymore, Atlantic City, N. J., September 14-16.

American Chemical Society, 116th national meeting, Atlantic City, N. J., September 18-23.

American Association of Oilwell Drilling Contractors, ninth annual meeting, Baker Hotel, Dallas, September 19-21.

National Butane-Propane Association, Jefferson Hotel, St. Louis, September 19-21.

Mid-Continent Oil and Gas Association twenty-seventh annual convention, Louisiana-Arkansas division Roosevelt Hotel, New Orleans, September 22-23.

American Institute of Mining and Metallurgical Engineers, regional meeting, Neil House, Columbus, Ohio, September 25-28.

American Society of Mechanical Engineers, fall meeting, Erie, Pa., September 28-30.

October

Independent Petroleum Association of America, Blackstone Hotel, Fort Worth, Tex., October 2-4.

American Society of Mechanical Engineers, petroleum division, 1949 Petroleum Mechanical Engineering Conference, Biltmore Hotel, Oklahoma City, October 2-5.

National Association of Corrosion Engineers, South-Central Regional Division, annual meeting, Adolphus Hotel, Dallas, October 3-4.

National Lubrication Grease Institute Hotel Roosevelt, New Orleans, La., October 3-5.

American Institute of Mining & Metallurgical Engineers, Petroleum Branch, fall meeting, Plaza Hotel, San Antonio, October 5-7.

American Association of Petroleum Geologists, regional meeting, Buena Vista Hotel, Biloxi, Miss., October 12-14.

Symposium on Instrumentation for the Process Industries, fourth annual session, School of Engineering, Texas A. & M. College, College Station, Tex., October 12-14.

American Society for Testing Materials first Pacific area national meeting, Hotel Fairmont, San Francisco, October 10.

Texas Mid-Continent Oil and Gas Association, annual meeting, Rice Hotel, Houston, October 13-14.

California Natural Gasoline Association, Ambassador Hotel, Los Angeles, October 7.

Oil Progress Week, October 16-22.

American Gas Association, annual convention, Chicago, October 17-20.

American Institute of Mining & Metallurgical Engineers, Petroleum Branch, fall meeting, Elk's Club, Los Angeles, October 20-21.

Independent Natural Gas Association of America, annual meeting, Baker Hotel, Dallas, October 31.

November

Society of Automotive Engineers, diesel, Chase Hotel, St. Louis, November 1-2.

Society of Automotive Engineers, fuels and lubricants, Chase Hotel, St. Louis, November 3-4.

American Petroleum Institute, annual meeting, Stevens Hotel, Chicago, November 7-10.

Petroleum Electric Power Association, annual conference, Hotel Beaumont, Beaumont, Tex., November 17-18.

American Society of Mechanical Engineers, annual meeting, Hotel Statler, New York, November 27-December 2.

December

American Institute of Chemical Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., December 4-7.

NOMADS

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

Federal Oil Excise Taxes Increased in Fiscal Year

WASHINGTON. — Treasury revenues from the three federal oil taxes amounted to $604,731,635 in the fiscal year ended June 30, an increase of $26,434,043 over the preceding fiscal year, according to figures released last week by the Internal Revenue Bureau.

There were indications, however, that the upsurge which carried collections from $495,119,795 in the fiscal year 1946, the first postwar year, to nearly $605,000,000 was slowing down, receipts for the first 6 months of the current calendar year showing an increase of only $4,842,209 over the corresponding period in 1948.

In the fiscal year just ended, the gasoline tax returned $503,647,470, an increase of $25,009,845 over the preceding year; lubricating oil returned $81,759,612, an increase of $872,690, and pipe-line transportation paid $19,324,553, an increase of $551,508, the bureau reported.

For the fiscal year 1946 the figures were: Gasoline, $405,694,551; lubricating oil, $74,601,713, and pipe-line transportation, $14,823,532.

The bureau announced that collections for the month of June included $48,154,758 from gasoline, against $47,103,139 in the same month in 1948; $10,523,264 from lubricating oil, against $6,448,139; and $1,830,537 from pipe-line transportation, against $2,110,409.

June Drilling Permits in Louisiana Totaled 220

A total of 220 drilling permits were issued by the Louisiana Conservation Department during the month of June, 26 of which were for wildcat exploration for oil or gas, Commissioner S. L. Digby announced.

There were approximately 304 rigs running in the state at the end of the month, including 59 in Houma district, 47 in Lafayette, 30 in Lake Charles, 41 in New Orleans, 35 in Monroe, and 92 in Shreveport.

America Needs '49ers

JUST a hundred years ago, the Forty-niners stormed the gold fields of California. They faced staggering obstacles, sure hardship, uncertain reward. Thousands failed, thousands of others realized modest gain, a few made fortunes. None sought or received help or direction from a benevolent government.

Now a century later, America faces another age of golden opportunity--an era when science and industry reveal new treasure to be had for the making. Turning today's visions into reality calls for '49ers--men of purpose and resolution, courage and independent spirit. You as a leader in your community may find a personal challenge and an inspiration in the Old '49er. By example and precept, you can help America toward her greatest accomplishments--in prosperity and peace.

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